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Annals of Horticulture

1891

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Annals of Horticulture

In North America

FOR THE YEAR 1891

A Witness of Passing Events and a
Record of Progress

By

L. H. BAILEY

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Annals of Horticulture for 1889

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INTRODUCTION.

IT IS now three years since this attempt to make an annual epitome of horticultural progress was first undertaken—although it had been formulated some years earlier—and it has at this time attained a definiteness of purpose which may be assumed to indicate its true and permanent character. I hope that the series possesses sufficient merit, at least in prospect, to commend it to students of plants and plant-cultivation. Its defects, I am aware, are great, but I trust that the most profound of them are such as issue almost necessarily from the vastness of any effort to summarize even the salient features of American horticulture. If the volumes should be found to possess no other merit, I hope that they will serve a useful purpose in classifying our scattered knowledge and in quickening the growth of a really worthy American literature of horticulture.

The kernel of the present volume is the census of cultivated native plants, which is the first attempt to discover the extent to which horticulture is indebted to our own fields and woods. Studies in greater detail in this direction may be expected in future volumes ; but the next investigation is to be devoted to our pomological resources.

I desire, also, to call attention to the Introduction Lists of the several years, and especially in this volume in which every effort has been made to render the list complete and accurate. But it is manifestly impossible to make such lists wholly complete without the co-operation of every dealer in seeds and plants. I am, therefore, anxious that my readers shall communicate with me whenever they have any knowledge which the volumes should possess. These annual lists, together with the list of kitchen-garden vegetables in the volume of 1889 and the census in the present volume, afford an important inventory of our horticultural resources, to which I hope to add the fruits and ornamental plants in the coming years.

L. H. BAILEY.

GARDEN HOME, ITHACA, N. Y.

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PART I.

GENERAL ANNALS.

§ 1. *Fruits, Vegetables and General Interests.*

The crops of 1891 have been a marked contrast to those of 1890. Last year was one of general failure in regions east of the Rocky Mountains, but this year has given large crops of unusally good quality. In most regions the weather has been propitious. The season was unusually dry except in the extreme northwest and the northern Pacific coast region, but horticultural crops suffered little. The general temperature record is also somewhat below the average for the growing months. Late frosts injured the peaches, grapes and small fruits in some parts of the eastern states, but the damage, except in restricted localities, does not appear to have been great. The country as a whole has been comparatively free from insect and fungous attacks. The condition of our horticultural interests has never been better than at present. Prices have been good as a rule, and products have reached the market in good condition. The winter of 1890-1 was steady and cold enough to bring fruit-trees to the blooming season in good and timely condition. The crops in Europe, however, have been for the most part poor or indifferent. This is especially true of apples, and the shortage has had the effect of holding up the prices on the heavy American exportations. The European grape crop is suffering more seriously year by year from the devastations of phylloxera and fungous troubles. The plum and pear crops of Europe are reported as fair to good. **The year.**

The apple crop of 1891 was good, although not heavy in most parts of the country. The extent of the crop is indicated by the export trade, which is nearly three times heavier than in 1890, when the eastern states produced almost no crop. This export trade has been fed largely by the crop of Canada, and the territory between the Hudson river and the ocean. Up to the 26th of December the exports were 974,495 barrels, against 344,262 barrels to the same date last year. The quality of the fruit is also superior, as is shown by the fact that ordinary grades of Newtown Pippins have found a slow sale in the English market, a condition which exists only when other varieties are unusually attractive. The prices in the foreign markets, notwithstanding the heavy exportations, have held firm, a condition which is attributed to indifferent and poor crops in Great Britain and on the continent.

Apple exports.

It is possible that great injury will come to our apple-export industry by the substitution of inferior varieties for standard sorts. This danger has often been brought to the attention of shippers by the agricultural press, but the alarm needs to be repeated. It is said that this year Peck's Pleasant and other green apples have been shipped to England as Newtown Pippins.

A good many apples have gone into the export trade from Virginia this year, chiefly Albermarle Pippin, York Imperial, Winesap and Willow Twig. Dealers find that the Virginia apples are poorer keepers than northern fruit of the same variety, and usually inferior in quality. The identity of the Albemarle Pippin and Newtown Pippin is still a moot point. Some New York dealers who export both varieties, insist that the Albemarle is a poorer keeper than the other, less firm, and usually not so high in quality. These differences are such as we should expect from the transfer of any variety from the north to the south, and tend to establish the original identity of the two varieties. The experience of dealers who handle large quantities of apples through a long series of years is invaluable upon such points as the influence of climate and other general conditions upon plants. It is a common expression among dealers that the apples of Michigan are poorer keepers than those of New York, while the best keepers come from Ontario and Quebec, even better than from Nova Scotia.

Climate and apples.

An important feature of the export apple trade is the large quantity of fall apples taken at good prices by the English trade. From the beginning of the export season until October 3rd, 113,513 barrels had been shiped from New York and ports

Fall apples.

north. Fall varieties, like Colvert, Gravenstein and King, brought from 16 to 25 shillings in Liverpool the first of October, while the true winter apples were opening at 12 to 18 shillings.

One of the most gratifying features of the apple returns of 1891 is the fair yield and unusually fine quality of the New York crop. In 1890 the crop in New York was exceedingly light, and much of the failure was thought to be due to the unusual prevalence of the apple-scab fungus; the crop this year is proof that such scourges may dissipate themselves in a single season.

The apple crop.

The estimated apple yield of the country, as given by the November crop-report of the Department of Agriculture, is as follows, the figures representing the percentage of an average full yield :

Maine	82	New Hampshire	89	Vermont	85
Massachusetts	85	Rhode Island	96	Connecticut	93
New York	85	New Jersey	100	Pennsylvania	90
Delaware	100	Maryland	100	Virginia	89
North Carolina	72	South Carolina	66	Georgia	69
Alabama	65	Mississippi	67	Louisiana	71
Texas	80	Arkansas	75	Tennessee	68
West Virginia	89	Kentucky	79	Ohio	51
Michigan	41	Indiana	78	Illinois	65
Wisconsin	65	Minnesota	70	Iowa	96
Missouri	69	Kansas	96	Nebraska	100
California	96	Oregon	92	Nevada	100
Colorado	90	South Dakota	90	Idaho	90
New Mexico	100	Utah	100	Washington	90

Many parts of the Pacific slope seem to be admirably adapted to the apple, as appears from facts given in ANNALS for 1890, and which are more fully presented upon succeeding pages of this volume. Parts of Virginia and North Carolina are also important apple-growing regions, even for late fall and early winter kinds, and the early northern markets have long been familiar with the early varieties of Delaware, Maryland and southwards.

Tasmanian apples, which began to attract attention in the San Francisco market in 1890, appeared in considerable quantity this year, as also apples from Australia and New Zealand. These fruits begin to reach California markets in April. Apples from these countries, especially from Tas-

Tasmanian apples. mania, are now consigned in large quantities to the English markets. Shipments from Tasmania to England were made so long ago as 1870, but it was not until four or five years ago that the industry became important. In 1888 about 10,000 cases (each holding about 40 ℔s. of fruit) were sold in Covent Garden market, London, at an average of from 15 to 30 shillings per case. In 1889 the quantity was quadrupled, with little change in price. In 1890 some 80,000 cases were sold, at prices averaging from 10 to 20 shillings. The Tasmanian apple industry is instructive as showing the distance at which profitable markets may be sought for horticultural produce.*

A possible new competitor in the English apple market is the Caucasus region, from which fruit was consigned to England this year for the first time. Not only apples, but cherries, pears and figs are said to succeed well there.

Peaches, plums, cherries. *Other orchard fruits* have been abundant and mostly of good quality during 1891. The *Peach* crop was enormous, despite the fears of injuries from late spring frost. In some localities, however, frost destroyed the crop, notably in southern Delaware. The yellows is seriously crippling the industry in the Chesapeake region. Much of the crop in the Middle States appears to have been inferior, probably owing to neglect of thinning the fruit and to cool and wet weather at ripening-time. The pack of canned peaches appears not to have been as heavy in the east as in some previous years. The Michigan crop was very large and was well handled, usually at paying prices. The orchards of southern Illinois, Missouri and Kansas gave very large crops. *Plums* and *Cherries* generally gave enormous crops, and prices held firm for well-managed fruit. In southern Illinois the plum crop is reported as light.

Pear crop. *Pears* and *Quinces* were a good crop. The estimated pear crop of the United States, as recorded in the November crop-report of the Department of Agriculture, is given below. The figures represent the product as compared with a full average crop :

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*A full account of the history of the Tasmanian apple industry and the methods of cultivation, is given in ANNALS FOR 1890, 9–15. See also ANNALS FOR 1889, 10.

Maine	92	New Hampshire	100	Vermont	91
Massachusetts	100	Rhode Island	100	Connecticut	94
New York	100	New Jersey	100	Pennsylvania	93
Delaware	100	Maryland	99	Virginia	86
North Carolina	63	South Carolina	57	Georgia	59
Florida	81	Alabama	51	Mississippi	64
Louisiana	85	Texas	77	Arkansas	79
Tennessee	68	West Virginia	82	Kentucky	78
Ohio	69	Michigan	69	Indiana	88
Illinois	89	Wisconsin	63	Iowa	92
Missouri	80	Kansas	93	Nebraska	100
California	100	Oregon	97	Nevada	110
Colorado	81	Idaho	87	New Mexico	97
Utah	100	Washington	93		

Oranges.

The orange crop is large and of good quality. An encouraging feature of the orange industry is the steady growth of the export trade. English markets are said to take the early or acid oranges at better prices than they bring in this country. California oranges are being shipped to Europe, but the export trade, so far as transportation is concerned, is in favor of the Florida growers, and our eastern markets will probably find, as a consequence, an increasing supply of California fruit.

The import orange trade is still large, however, as is shown by the following figures of receipts, in boxes, from Palermo, Sicily, from October, 1890, to September, 1891 :

	Oranges.	Lemons.
At New York	278,433	808,412
Boston	165,804	144,244
Philadelphia	56,290	84,161
New Orleans	35,567	250,447
Baltimore	5,675	5,109
Montreal	4,349	2,105
Totals	546,118	1,254,478
Corresponding period, 1889–90	464,508	1,529,892

The total imports of oranges and lemons into the United States from all sources for the last three months of 1890 and 1889 are as follows :

	1890.	1889.
Oranges	$339,737	$231,633
Lemons	718,916	327,477

These figures, taken in connection with the large crops of home-grown oranges, show that the consumption of citrus fruits is rapidly increasing in this country.

Orange imports. The trade in foreign fruit has been less than last year, however. The following figures of orange and lemon importations for 1890 and 1891 show a decrease this year, especially in oranges late in the season. The reasons for this falling off are not easy to determine. Many dealers attribute it to the abundance of domestic fruit, but the tariff no doubt has much to do with it.* The foreign orange and lemon crops are reported as good.

Orange Importations.†

	Cases.		*Boxes.*	
	1890.	1891.	1890.	1891.
January	47,140	14,563	57,341	91,710
February	52,529	9,217	79,667	61,522
March	10,637	992	102,982	121,234
April	14,554	266	144,464	147,070
May	8,997	.....	102,486	76,550
June	550	.....	61,486	74,985
July	......	.....	37,308	38,355
August	......	.....	4,024	13,960
September	......	.....	365	4,765
October	......	.....	......	425
November	......	.....	2,770	147
December	17,143	1,900	47,180	5,777
	151,000	27,488	640,073	636,500

The Valencia crop is said to be large and of good quality.

Lemon Importations.

	Boxes.	*Boxes.*
	1890.	1891.
January	36,750	78,800
February	107,679	67,560
March	100,406	95,325
April	172,483	100,000
May	184,872	256,000
June	184,725	226,300
July	221,851	207,310
August	124,796	172,300
September	62,801	86,005
October	50,790	53,522
November	130,430	73,149
December	117,950	158,716
	1,495,533	1,318,987

---

*For tariff schedules, see ANNALS FOR 1890, 133.

†*Fruit Trade Journal,* Jan. 9, 1892.

An interesting phase of the orange industry is the possible northward extension of it in an amateur way by means of the Satsuma or Oonshiu type. This type appears to be hardy even as far north as the Carolinas. Professor W. F. Massey, of Raleigh, North Carolina, writes me this account of it: "My Satsuma or Oonshiu orange passed through 15 degrees above zero, Nov. 29, 1891, by a standard thermometer hanging exposed a few feet from it. The leaves were a little singed for the first time. The tree stands in the most exposed place I could select, on a hill-top where the north wind strikes it without break for twenty miles. I have no longer any doubt of its hardiness, at least in the coast region."

Satsuma orange.

The United States lemon crop does not yet assume much importance, largely because of the lack of proper attention in curing and the growing of inferior kinds. But intelligent attention is now directed to lemon-culture, and within a few years it will no doubt become a prominent industry.

Lemons.

Competition in the citrus-fruit trade may be expected to increase from Mexico, Central America and the West Indies. The importation of oranges from Jamaica reaches over two hundred thousand dollars' worth annually. The new trade relations between the Spanish countries and the United States must increase this fruit-traffic. The Mexican International Steamship Company has been organized to undertake trade between Philadelphia and Mexican ports, and steamers will begin to run about the opening of 1892. Trinidad will probably become an important competitor in the American orange and lemon market. Fruits from this island have already appeared in New York and elswhere. The following note of the fruit-culture of Trinidad is from the London *Times*: "From an advance copy of Sir William Robinson's Report to the Colonial Office on the colony of Trinidad, we are able to give some details of fruit-growing in that island. The Governor is able to report that this industry, which he foresees will be of incalculable benefit to the colony, and which he has spared no endeavors to promote, has at length commenced to show some encouraging results. The Central Agricultural Board, a most useful and influential association, has energetically worked with his Excellency in this object, and has been the means of stimulating enterprise and spreading valuable information throughout the length and breadth of

Spanish American trade.

the island by its discussions and publications. It was in the spring of 1889 that small shipments of fruit, chiefly oranges and bananas, were first made to the American markets by the newly subsidized line of steamers. These shipments were necessarily of an experimental character, and produced very varying results, some fruit fetching fair prices, and others being sold at a loss. This, however, is not difficult to account for. The shipments were of a spasmodic character, and the processes of packing and picking, which demand the greatest care, were but little understood. The first operations, too, were commenced at a rather unfavorable period of the year, in which Trinidad fruit had to compete with that from other well-known fruit-growing countries where the requirements of the market were thoroughly understood, and it is not surprising, therefore, that the pioneers of the new industry were somewhat disheartened at the results obtained. The Central Agricultural Board and its agents, however, urged the people to persevere, and in the opinion of Sir William Robinson the industry may now be considered to be firmly established. The principal exports have consisted of oranges, limes and bananas. Experiments have been made with other products, but not with satisfactory results. Five thousand two hundred crates of oranges were shipped in the four months ending December 31, 1890, which constituted the season for that year. Two larger plantations were started during the year, and numerous smaller ones. A notice written by the Governor calling attention to the advantages of this industry was extensively circulated throughout the colony in English, Spanish, French and Hindustani. Trinidad limes were first placed on the New York market in 1889. These did fairly well, and in 1890 there was a considerable increase in the shipments. Several abandoned lime plantations have been reclaimed, and the exports of this product will, no doubt, increase rapidly, as it has been discovered that they can compete favorably with Sicilian lemons. The shipments of bananas have considerably fallen off in 1890 as compared with 1889. The fruit spoils very quickly, and it has been found that small quantities cannot receive the special care and attention which they require. Large areas are, however, being planted up with bananas, but the excessive rainfall of 1890 has somewhat retarded operations. Dried bananas have

Trinidad.

been placed on the Canadian and American markets with the most encouraging results."

Grapes have been fair to good in yield and of unexcelled quality. In New York, which is the most important grape-growing region in America outside of California, the crop was medium to fair, the shortage being due, in part, at least, to late frosts. Fair returns were obtained from the crop, however. In the middle west, as Missouri, the grape crop has been large.

Grape crop.

The grape crop is estimated as follows in the November crop-report of the Department of Agriculture, the figures representing the percentage of an average full crop :

Maine	90	New Hampshire	95	Vermont	92
Massachusetts	95	Rhode Island	100	Connecticut	93
New York	89	New Jersey	90	Pennsylvania	85
Delaware	100	Maryland	86	Virginia	75
North Carolina	86	South Carolina	90	Georgia	90
Florida	90	Alabama	90	Mississippi	92
Louisiana	75	Texas	89	Arkansas	85
Tennessee	84	West Virginia	60	Kentucky	80
Ohio	43	Michigan	68	Indiana	78
Illinois	92	Wisconsin	86	Minnesota	95
Iowa	90	Missouri	80	Kansas	88
Nebraska	100	California	93	Oregon	100
Colorado	98	South Dakota	90	Idaho	100
New Mexico	95	Utah	95	Washington	90

The census report upon viticulture (Bulletin 38, March 10, 1891, by H. Gardner) divides our leading grape-areas into five regions : the Eastern, including New York and that portion of Pennsylvania lying upon lake Erie ; the Middle, including Ohio, Indiana and Illinois ; the Western, lying in Kansas and Missouri, the Southern, in Georgia, Tennessee, North Carolina and Virginia ; the Pacific, comprising California and parts of Arizona and New Mexico. Of these, the Pacific division comprises the greatest acreage, there being no less than 213,230 acres in cultivation, of which 157,458 acres are in bearing. The Eastern or New York region follows next with 51,000 acres, the Middle with 42,633 acres, the Western with 17,306 acres, and the southern with 17,092 acres. About 60,000 acres are in cultivation outside these definite areas, making a grand total of 401,261 acres in the United States, of which 307,575 acres are in bearing.

Grape statistics.

The product of this enormous acreage is sold as table-grapes, wine and raisins. In the production of table-grapes New York leads with 60,687 tons in 1890, and is followed by Ohio with 38,947 tons, California with 38,785 tons and Missouri with 22,500 tons. In the production of wine, California leads with 14,626,000 gallons, and is followed by New York with 2,528,250 gallons, Ohio with 1,934,833 gallons, and Missouri with 1,250,000 gallons. In raisins California produces practically the whole quantity grown. The highest average yields per acre are reported in Arizona, Missouri, and New Mexico, which give three tons to the acre, while California gives only 1.77 tons per acre, which is less than Illinois, Kansas, Ohio, Tennessee and Virginia. The highest market value of grapes per ton is $96 in Georgia, which is followed by Tennessee at $89, New York at $70, Indiana at $67, North Carolina and Virginia at $60, while California and Arizona give the lowest returns, with $17.66 and $16.50 respectively.

Grapes in the south-west.

An interesting feature of this census report is the estimate of the grape interest in Arizona and New Mexico, and it seems to show that those territories are destined to be great wine and raisin centers: "Viticulture in Arizona and New Mexico is comparatively new, but it is thought to have a prosperous future. Not only do the native varieties of grapes grow in these territories, but the European, or vinifera, also flourishes here. The Muscat varieties, grown so succesfully in California for raisins, grow equally well in these territories; also varieties that produce a fine sherry wine. This is one of the most prominent features of viticulture in Arizona. Mr. J. De Barth Shorb, a prominent vine-grower and wine-maker of southern California, after experimenting in Arizona, reports that the sherries produced there have the true sherry flavor and are made by the natural process; that is, without it being necessary to 'bake' them. They not only have the flavor of the Spanish sherries, but also the same excellent qualities. So far, the fine sherries produced in this country have come from that territory. The same authority states that Arizona will be to the United States what Spain is now to Europe. There were in 1889 in Arizona 1,000 acres of bearing vines and 1,500 acres of new vineyards. The product was 2,850 tons or 5,700,000 pounds of table-grapes, of which 150 tons or 300,000 pounds were sold to wineries. In New Mexico in 1889 there were 1,186 acres of bearing vines and 9,000 acres of new vineyards, which produced 296,500 gallons of wine and 1,779 tons or 3,558,000 pounds of table-grapes. The information received from New Mexico by the census office shows a great advance in viticulture since irrigation has proved practicable. Two companies are building immense canals 45 feet wide at the bottom, capable of carrying seven feet of water. These canals will irrigate 400,000 acres of as rich land as can be found in the world adapted to the growth of fruit and grapes.''

Largest and smallest vineyards.

The largest vineyard in the world is at Tehama, California, which comprises 3,800 acres and to which 1,000 acres are to be added at once. In April, 1890, this great establishment had in stock 300,000 gallons of brandy and 1,000,000 gallons of wine. But if ''Califoraia has the largest vineyard in the world, it may be well to state that she has also the smallest. It is a vineyard consisting of a single vine, in Santa Barbara county. It was planted by a Mexican woman about sixty years ago, and has a diameter at one foot from the ground of 12 inches, its branches covering an area of 12,000 feet, and produces annually from 10,000 to 12,000 pounds of grapes of the Mission variety (many bunches weighing six and seven pounds), the crop being generally made into wine. The old lady who planted this one-vine vineyard died in 1865 at the age of 107.''

Early statistics.

In the Pacific division the European grape is grown almost entirely. This division contains somewhat over half of the entire grape-acreage of the country, but the greater part of the product is consumed in wine and raisins. Most of the table-grapes of the country are produced on the remaining half of the grape-acreage, and these are the native grapes of our woods. No more remarkable instance can be produced of the rapid improvement and dissemination of native species of plants in any country. In 1825, according to Rafinesque, there were 600 acres devoted to grapes in North America, of which the larger part were undoubtedly planted to the European species (*Vitis vinifera*). Five years later there were some 5,000 acres under cultivation. The native grapes, improved by cultivation, are now grown upon nearly 200,000 acres in the United States, and they yielded in 1890 9,655,905 gallons of wine and 225,636 tons of table-grapes! And to this can be added a very large acreage in Canada. All this native grape industry has arisen since the introduction of the Catawba by John Adlum between 1820 and 1830. Adlum was regarded as a visionary in his day, but in the light of these developments, the simple record of his hopes and labors and disappointments is sad. He had long endeavored to direct attention to the native grapes, and he had applied to the president of the United States for a lease of a bit of public ground in Washington to enable him to cultivate them. But the country was not yet ready for experiments in agriculture, and he was obliged to confine his efforts to his own resources. And then, lest he should die before his work became known, he published a little book on the subject. "As I am advancing in years, and know not when I may be called hence, I am solicitous that the information I have acquired should not die with me." "I have been obliged to prosecute the undertaking myself, without assistanee and without patronage, and this I have done to the full extent of my very limited means." Speaking of his best grape, the Catawba, he said: "In bringing this grape into public notice, I have rendered my country a greater service than I would have done had I paid the national debt." Time has drawn its curtain over the work of Adlum, and now the government willingly spends its thousands to prosecute labors less important than his. Every man who loves the grape should feel grateful to Rafinesque for bestowing the name Adlumia upon the charming "Alleghany vine" of our woods, and he should grow the plant at his door!

The native grapes.

Small fruits of all kind have been unusually abundant, and considering the great yields, prices have been good. In southern Illinois, which is one of the largest fruit-growing regions of the country, the strawberry crop was enormous, and as the weather was unfavorable during some of the picking-season the market became dull. Heavy yields of raspberries, blackberries, currants and gooseberries are reported in every direction.

Berries.

Cranberries show gains over last year in the east, but heavy decrease in Wisconsin. The light crop in the west is chargeable to frosts. The *Milwaukee Sentinel* made this comment upon the summer condition of the Wisconsin bogs: "It is reported that at least 25 per cent. of the prospective cranberry crop of this year at Berlin, Wis., was destroyed by the frost of the morning of July 8. The damage in this county from the same cause amounts to about 15 per cent. of the crop. But the most serious part is the damage done to the crop of next year. In many places where the blossom was not injured by the frost, and in all cases where it was injured, the terminal bud of the upright which lies above the fruit was killed. It is this that matures the fruit-bud for next year's crop, and it is now too far along in the season for the plant to produce in its stead a lateral upright that will mature a fruit-bud. The season is on the whole a little late, and unless we have a fair amount of moist, warm weather during the next four weeks, the crop will be more liable than usual to be caught by the early fall frosts. For, notwithstanding the large amount of money that has been expended in ditches and dams, less than one-tenth of the crop is in a position to be protected from the frosts."

The cranberry crop.

The October crop-report of the American Cranberry Growers' Association makes the following estimates:*

New England, 420,000 bushels, a gain of 22 per cent. over 1890.
New Jersey, 244,000 bushels, a gain of 12 per cent.
The West, 38,250 bushels, a loss of 83 per cent.

The report makes the following comment upon the market: "The market opened on Cape Cod with plenty of buyers, at prices ranging from $6 to $7 per barrel. New Jersey also, against the usual custom, came in for a share, and a number of carloads of fruit, of uncertain quality, found purchasers at $1.75 to $2 per crate. The unusually hot weather of September was unfavorable for the consumption of cranberries by the usual process, but extremely favorable for their consumption by nature's process. The Early Blacks of the Cape and the early picked Jerseys vanished before the destroyer heat, and the result was a great loss to dealers who had stocked up so liberally. The upshot was a complete 'slump' in the market. This experience over, the market resumed on a new and extremely conservative basis. The bulk

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*Since the above was in type, the following final estimate of the crop of 1891 has been received from the secretary of the Cranberry Growers' Association:

New England	480,000 bushels.
New Jersey	244,000 "
The West	40,000 "
	764,000

of the New England crop was moved at prices varying from $5 to $6 per barrel, and New Jersey did not wait, as usual, till the New England crop was out of the way, but began moving her crop at prices that were satisfactory to dealers, at least. With the cool weather came renewed confidence and a healthy strengthening of prices. The large New England crop has nearly all been moved, and attention has for some weeks been centered on New Jersey, where dealers find growers in a favorable mood for trade; and a larger portion of the crop than we ever knew before has changed hands at low prices, varying from $1.10 to $1.50 in the dirt to $1.50 to $2 cleaned. Reports from the various township secretaries indicate a movement of over 50 carloads up to October 20, something unprecedented for New Jersey. To the holder of cranberries the situation to us never seemed more favorable. The question is not so much, 'At what price will the balance of the crop be marketed?' as, 'Who will be the fortunate ones when the advance over the present low prices comes, which it is morally certain to do?' The good crops of the east are more than offset by the shortages of the west; so that the total crop of the country is still short of last year by nearly 100,000 bushels. The abundance of other fruits will, no doubt, prevent any extravagant prices for cranberries; but the crop of winter apples is very moderate, and there is no reason why good prices for cranberries should not prevail for the balance of the season."

The cranberry market.

Vegetables of all kinds have given good yields and fair returns as to prices. *Potatoes* were usually good, much better than in 1890, owing to less injury from blight. Blight was serious in many places, however. The December crop-report of the United States Department of Agriculture makes the following estimate: "The potato crop in 1890 was very small, making the smallest supply per capita which we have had during any recent year. As a result, the average value per bushel was very high, but the short crop and inferior quality in most of the districts of large production prevented farmers from securing any of the advantages of the high prices. The present crop has been one of large proportions, the acreage having been increased and the season favorable in all districts where it is grown. As a result, there is a heavy decline in values. The present farm-price is returned at 37.1. The result in the case of this crop shows what may usually be

Potatoes.

expected when crops in excess of ordinary demands are grown. With an increase this year of nearly 100,000,000 bushels in production, the aggregate value of the crop is less than that of last year by perhaps $20,000,000. It is a fact which our farming population must learn, that the surplus produced above requirements always acts powerfully in depressing the value of the whole crop. This small fraction is made to regulate the values for the aggregate product.''

Tomatoes.

The *Tomato* is yearly becoming more important, and it gives promise of becoming the most prominent crop of the vegetable-garden. Not only is the consumption of the fresh fruit rapidly increasing, but the amounts of packed goods grow larger year by year. The largest tomato-regions are probably those of Maryland and adjacent areas, and southern Illinois. Tomato-culture is gradually extending in all parts of the world, even in Japan where the fruit has always met with an indifferent reception. London markets have received consignments this year from the Canary Islands. The fruits are packed in boxes holding from three to four pounds, and they sell at from seven to ten pence per pound. It is said that the production of tomatoes, potatoes, peas and other vegetables for the English markets is coming to be so profitable in the Canary Islands that some of the older types of farming are being abandoned. The tomato crop of southern Illinois is the subject of the following editorial comment of the *Fruit Growers' Journal* for August 15: ''The tomato-season is drawing to a close in southern Illinois; about ten days will close the business for this year. The acreage of tomatoes was so large, that with only a moderate yield the total was large. Sixteen carloads was the largest single day's shipment from this place [Cobden]. The gathering-season has been one of strife and hurry. A good peach and apple crop coming on at about the middle of the tomato-season, and the raspberry and blackberry crops coming with the first half, have together made this the most exciting tomato-season seen in many years. The prices realized for tomatoes have not been such as to discourage large plantings next spring. Early pickings paid well, and the prices gradually ran down to the point when the shipments were the heaviest, when for three or four days Chicago shipments paid very little above expenses. Heavy shipments to other cities at once relieved the Chicago market of its burden, when prices at once rallied, and they have since been such as to give good returns. As to varieties, the old Acme easily holds its place as the favorite, while the Atlantic Prize has mostly superseded the Canada Victor, Alpha and Conqueror, as an early variety. It was reported last year that the Atlantic Prize did not give satisfaction at Crystal Springs [Miss.], and we advised a trial of the Conqueror at that place, but have not yet learned the result. It is a little singular that Chicago dealers report but two varieties, Acme and Trophy. With them, everything that is not an Acme is a Trophy, while the fact is there are very few Trophies grown anywhere, although we are not certain that it is not better than many of the newer varieties that are much more largely grown. It seems to be a settled fact that location, even in the same neighborhood, yes, upon the same farm, should determine the variety grown. It was the case in this vicinity where the Conqueror was largely grown, that some growers could not get a satisfactory yield of that variety, while the Acme did exceedingly well; and with others the exact reverse was true. On our own place there are locations where the Acme will rot so badly as to render its production unprofitable, while the Atlantic Prize never rots, but does not do well in the grounds where the Acme is a success. With us the Acme does best on low, damp ground where it might be expected that its well-known tendency to crack would be increased. Perhaps it may be accounted for by the theory which attributes the cracking of fruit to the well-established principle of endosmose and exosmose. The skin of the tomato separates two fluids of unequal density. The juice of the tomato being heavier than the water contained in the atmosphere, there will be a transudation of the tomato-juices through the skin to establish an equilibrium."

Varieties of tomatoes.

The tomato is yearly assuming more importance as a winter crop in the north. It is forced to great advantage in warm and light-houses, and the product sells readily at prices ranging from 25 to 75 cents per pound. There are many difficulties in its cultivation in the way of fungous and other injuries, however, and it is doubtful if it will ever be grown so extensively under glass as lettuce and radishes.

Winter tomatoes.

The tomato-pack of canned goods of 1891 was the largest on record. The following statistics of the pack, in cases of two dozen cans each, for two years, were compiled by the *American Grocer* :

STATES.	1891.	1890.	STATES.	1891.	1890.
	Cases.	*Cases.*		*Cases.*	*Cases.*
New Jersey	950,833	815,485	Nebraska	26,900	5,670
Maryland	744,010	949,157	Pennsylvania	15,000	21,285
Indiana	341,217	243,920	Connecticut	14,400	15,500
Delaware	264,950	230,025	Colorado	12,600	4,500
California	218,311	222,173	Massachusetts	10,000	18,000
New York	114,774	101,952	Kentucky	10,000	14,972
Virginia	98,360	95,694	Arkansas	14,500	20,000
Iowa	94,800	98,904	Tennessee	6,840	1,910
Ohio	90,590	75,060	Texas	4,500	10,850
Missouri	90,350	28,400	North Carolina	3,900	3,150
Canada	83,000	73,246	Georgia	3,000	3,000
Michigan	73,506	51,484			
Illinois	68,324	32,250	Total	3,405,365	3,166,177
Kansas	50,700	29,590			

The following table shows the output of canned tomatoes for the last six years ;

YEAR.	TOTAL PACK.
	Cases.
1886	2,363,760
1887	2,817,048
1888	3,343,137
1889	2,976,765
1890	3,166,177
1891	3,405,365

The *sweet-corn* crop of 1891 was large, although it has been exceeded. This crop has assumed new importance within the last few years, because of its increasing use as a canned vegetable. Upon this subject the statistician of the Department of Agriculture makes the following comment in "Report of the Crops of the Year," 1891 : "The roasting-ear, the green corn upon the cob, has been recognized as a standard article of food during the season in which it may be obtained, in this country at least, since it was first introduced to the notice of the original settlers. It is only within comparatively recent years, however, that successful methods have been followed in preparing it for use outside of its ordinary period of growth. This branch of the industry is now a very large one, and factories are to be found in very many sections of the country where the sweet varieties of maize are grown. The principal packing districts are in Maine, New York and the Atlantic coast,

Sweet corn.

as far south as Virginia, although in the central west, where the surplus corn which supplies commercial demand is grown, it is rapidly assuming importance. The reputation of this class of our canned goods product is attested by the steady and rapid increase of the amount consumed by our own people."

The corn-pack of the year is thus detailed by the *American Grocer:*

STATES.	1891.	1890.	STATES.	1891.	1890.
	Cases.	*Cases.*	States.	*Cases.*	*Cases.*
Maine	614 894	503,939	Delaware	40 000	. . . . .
Maryland and Virginia .	461,240	260,308	New Jersey	27,000	3,700
New York	536,814	305,691	Michigan	12,140	4,000
Illinois and Indiana . . .	476,735	225,198	Kansas	11,800	3,967
Iowa	213,001	108,493	Massachusetts . .	11,000	9,700
Ohio	194,800	80,700	Missouri	9,720	2,500
Nebraska	81,750	10,925	All other states . .	96,559	28,475
Pennsylvania	49,700	. . . .			
Canada (partly estimated)	52,000	41,264	Total . . .	2,799,453	1,588,860

In the last seven years the total corn-pack of the United States has been as follows:

YEAR.	TOTAL PACK.
	Cases.
1885	1,082,174
1886	1,704,735
1887	2,311,424
1888	3,491,474
1889	1,760,300
1890	1,588,860
1891	2,799,453

Melons.

The *melon* crop of the country continues to increase in extent and importance. Missouri is coming to be one of the largest growers. A new departure was made in the industry this year in exporting melons to England. A trial lot was sent from Macon, Georgia, the first of August. The result of the experiment is not known to me.

The *onion* crop is probably the most staple product of American truck-gardens, and it is likely to assume still greater importance to American growers since the passage of the new tariff law. The following review of the onion trade is written by G. S. Palmer for the *Fruit Trade Journal* for August 2:

The onion industry.

"The new tariff law places a duty of 40c. a bushel on onions. About 409,597 bushels of onions were imported into the United States during the six months from January 1 to July 1. The increased tariff on onions is a big thing for the farmers engaged in truck-growing throughout the United States, and is bound to stimulate the onion industry in this country, especially in the southern states. Inasmuch as we have the soil and climate to produce good onions in our different latitudes, and an additional protection is placed on them by the new tariff law, special inducements are offered to make onion-growing more of a specialty, and one of the leading features of our southern trucking sections, especially in Florida, whose only competitors can be Bermuda and Spain. The only necessary thing is to obtain the proper seed and plant sufficiently early, in order to compete with those localities. We may not see again very soon such a continued favorable market as at present. But to the American growers (who have no duty to pay) prices about 50 cents per bushel lower would be equally profitable, and there ought to be some little advantage to them in lower freights as well. There is one advantage which the onion has as a southern crop, in its not being immediately perishable, and it will bear transportation well if properly cured and packed; its sale need not therefore be forced. Furthermore, onions have become as staple an article of produce as potatoes, corn or wheat, and are consumed by all classes, and there is a steady demand. But the one important feature is their condition, and it is imperative that they be well cured and dry, as no immature stock can be transported and disposed of profitably. The following are the correct figures (which were obtained from the Customs Department) of the imports, in bushels, from the localities named, January 1 to July 1, 1891:

England	68,255
France	14,250
Cuba	42,464
British W. Indies	242,579
Italy	4,930
Portugal	100
Spain	1,113
Philippine Islands	146
Turkey, Europe	24
Turkey, Asia	3,930
Turkey, Africa	31,786

This aggregates a grand total of 409,597 bushels, on which duty was paid into the United States Treasury of $163,837.80. These heavy importations found ready sale at very favorable prices, our northern old crop being short. The first arrivals during January were the Bermuda old crop, which sold from $2 to $2.50 per bushel. Next followed the new crop from Cuba during February, and sold at $2.50 to $2.75 per crate. Domestic onions at the same time were selling at $3.50 to $4.50 per bushel. Then followed, during February and March, shipments from Bordeaux, France, also from Spain. Former prices were firmly sustained until the height of Bermuda shipments during the latter part of May, when the market declined, and the lowest price touched was $1.25 per crate. The market again reacted, and the Virginia, which is the last southern crop, sold during June at $3 to $4 per barrel, and the last shipments, at the middle of July, sold at $5 to $5.50 per barrel. Shipments from Africa did not begin to arrive until April, and it was not until May and June that shipments were received from Spain, Asia, Turkey, Philippine Islands and Portugal."

The new onion-culture.

A departure in onion cultivation is the transplantation of the young plants, for the purpose of increasing the yield and securing an earlier crop. This practice has been employed to some extent for a number of years by growers here and there, but it was first brought prominently into public notice by Green of the Ohio Experiment Station, and Greiner of New York, a little over a year ago.* It promises good results wherever intensive onion cultivation is practiced.

Trucking interests.

The *trucking interests* of the United States are shown to be enormous by the investigations of the census bureau. Bulletin 41 (Mar. 19, 1891), by J. H. Hale, is concerned with truck-farming. It shows that upwards of $100,000,000 are invested in truck-farming, and the product for 1890, after paying freights and commissions, amounted to $76,517,155. Five hundred and thirty-four thousand four hundred and forty acres of land are devoted to the industry, and this requires the labor of 216,765 men, 9,254 women, 14,874 children, and 75,866 horses and mules. The value of the implements employed is $8,971,206. Yet, great as this industry is, the greater part of it has developed in the last thirty years. The acreage of truck crops is distributed as follows :

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*See Bull. 9, Ohio Exp. Sta., Oct , 1890, by W. G. Green. "The New Onion-Culture," by T. Greiner, 891.

Watermelon	114,381	acres
Cabbage	77,094	"
Pea	56,162	"
Asparagus	37,970	"
Sweet-potato	28,621	"
Melon	28,477	"
Potato	28,046	"
Tomato	22,802	"
Spinage	20,195	"
Celery	15,381	"
Bean (string or snap)	12,607	"
Cucumber	4,721	"
Kale	2,962	"
Beet	2,420	"
Miscellaneous	82,601	"
	534,440	

These crops are grown over a large extent of territory, which, for convenience of classification, is divided into twelve sections or districts :

1. New England district : The field-crops supplying Boston and other New England cities, and the greenhouse products supplying all the large cities of the East.

2. New York and Philadelphia district : New York state, Long Island, New Jersey and Pennsylvania, which contributes largely to the New York and Philadelphia markets.

3. Peninsular district ; Delaware and the eastern shore counties of Maryland and Virginia, which supplies all the northern and some of the central west markets.

4. Norfolk district : Eight southeastern counties of Virginia and eight northeastern counties of North Carolina, which largely supplies northeastern and central western markets.

5. Baltimore district : Western Maryland, West Virginia and that part of Virginia not in the peninsular and Norfolk districts, largely tributary to Baltimore, Washington and northern cities, as well as local canning factories.

6. South Atlantic district : North Carolina, South Carolina, Georgia and Florida, supplying northern markets, east and west.

7. Mississippi Valley district : Alabama, Mississippi, Louisiana, Tennessee and Kentucky, tributary to north central and northwestern cities.

8. Southwest district : Texas, Arkansas, Missouri and Kansas, largely tributary to St. Louis and Kansas City.

9. Central district : Ohio, Indiana, Illinois, Michigan, Wisconsin, Iowa and Nebraska.

10. Northwest district: Minnesota, North Dakota and South Dakota.

11. Mountain district: Idaho, Wyoming, Utah, Nevada, Colorado, New Mexico and Arizona.

12. Pacific Coast district: California, Oregon and Washington.

The distribution of these crops, by acres, is as follows:

Districts.	Asparagus.	Beets.	Snap or string beans.	Celery.	Cabbage.	Cucumbers.	Kale.	Watermelons.	Other melons.
1 New England . .	242	83	65	443	1,586	272	. . .	210	645
2 New York and Philadelphia . .	6,592	864	2,710	4,058	41,054	870	110	7,320	7,223
3 Peninsular	2,640	67	615	97	3,275	313	590	2,469	1,160
4 Norfolk	1,573	116	1,098	130	9,790	285	878	2,974	1,784
5 Baltimore	2,270	134	585	198	4,165	360	261	620	475
6 South Atlantic . .	14,090	766	3,465	. . .	3,309	1,265	690	55,726	1,102
7 Mississippi Valley	2,323	144	1,376	46	2,816	354	240	6,069	1,343
outhwest	1,719	60	1,875	313	2,730	894	170	8,098	2,238
9 Central	5,864	186	818	9,812	6,103	108	23	28,771	12,210
10 Northwest	135	. .	. . .	150	400	. . .	. .	. . .	. . .
11 Mountain	12	. .	. . .	18	496	. . .	. .	390	18
12 Pacific Coast . . .	110	. .	. . .	116	1,370	. . .	. .	1.734	279

Districts.	Peas.	Irish potatoes.	Sweet-potatoes	Spinage.	Tomatoes.	Miscellaneous	Aggregate.
1 New England . .	1,476	427	. .	310	305	774	6,838
2 New York and Philadelphia . .	9,446	2,361	4,660	3,262	6,990	10,615	108,135
3 Peninsular	3,224	1,295	4.860	2,128	416	2,565	25,714
4 Norfolk	5,858	3,305	3,187	5,965	525	7.507	45,375
5 Baltimore	5.170	2,860	3.150	1,980	3,780	11,173	37,181
6 South Atlantic . .	12,899	5,850	3,133	1,838	2,986	4,322	111,441
7 Mississippi Valley	5,879	4,071	1,160	1,590	3,170	5,599	36,180
8 Southwest	3,281	3,602	3,725	1,378	2,918	3,888	36,889
9 Central	7,555	2,845	4,556	1,744	1,362	25,457	107,414
10 Northwest	60	. . .	. .	. . .	60	278	1,083
11 Mountain	90	840	. . .	. . .	. .	1,969	3,833
12 Pacific Coast . .	1,224	590	190	. . .	290	8.454	14,357

"Taken in its entirety, this comparatively new industry is found to be in a healthy, prosperous condition. New sections are being developed from year to year that to a certain extent affect the prosperity of some of the older ones, and there is likely to be more or less shifting of trucking-centers every few years, all upon advancing lines, however. New and better methods of culture, with the further invention of labor-saving machinery, must of necessity reduce the cost of production. Better transportation facilities will place the products of these farms in cities and towns more promptly, in better condition, and at less cost; while the ever-increasing population and wealth of the cities and towns insure a greatly increased consumption at satisfactory prices for first-class productions." This report does not cover all the vegetable-growing of the country, for a most unwarrantable distinction is made between truck-gardening and market-gardening, and the latter is not considered in the bulletin. Truck-gardening, as understood in the bulletin, is "carried on in favored localities at a distance from market, water and rail transportation being necessary," while market-gardening is "conducted near local markets, the grower of vegetables using his own team for transporting his products direct to either the retailer or consumer." Mere distance from market or methods of transportation have not before entered into definitions of horticultural vocations. It is not apparent where those growers belong—and they are legion—who are so fortunate as to market their products both by team and rail. It is to be hoped that the final census reports will give enumerations upon the vegetables grown for market. But the present bulletin is sufficient to show that truck-gardening is one of our most important industries.

Truck-garden-

The seed crop. The season of 1891 was a very peculiar one as regards the seed crop. The crop of nearly every species of vegetable, whose seed is extensively grown in this country, promised at first and up to a very short time before harvest an exceptionally good return, and yet one after another the crops proved failures so that the quantity of seeds of the growth of 1891 which finds its way into the warehouses of the seedsmen will be much less than for several years past. This is true of the general returns, although with nearly every variety there have been isolated crops which have been exceptionally large. The cabbage-seed crop on Long Island and in the Puget Sound region, while much less than it promised early in the spring, was still fair, and a normal and desirable quantity was harvested. The onion-seed crop of New England was below the average, and that of Michigan and the Central States very light, although it seemed, up to within ten days of gathering, as if there was to be an enormous yield. The crop in California was light. The California lettuce-seed crop was a very good one and there is an abundant supply for the whole world, for all now look to California for seed of this vegetable. Seed-beans were a light crop in New England and New York, and a fair one in the West. Of peas, particularly the Extra Earlies, there was not the usual acreage planted and the comparatively light crop makes them rather scarce. Seed-corn is fairly abundant and of better quality as to vitality than last year. Vine-seeds were a very light crop, those in the famous Platte river districts of Nebraska a total failure—so that were it not for stocks carried over the shortage would be very serious. This is the more curious, as early in the season both cucumber and melon-growers, both in New Jersey and in the west, who had grown fruit for the market and were unable to sell it, offered to get out large quantities of seed; but the distrust which seedmen have of such crops and their belief that their own crops would amply supply them, prevented their buying, so that much seed which, if saved, might have relieved the present shortage was allowed to waste.

The seed crop.

As to the cause of the general failure, it is supposed that it is largely due to the excessively hot days and hot winds which occurred just as the seeds were setting and maturing, and which in some cases destroyed the seed already set and in others prevented pollination. It is noticeable that those varieties of beans and of peas which have the habit of setting fruit through a long period are a nearly full crop, while those whose crop is all made at once are very short. For instance, Valentine and Refugee beans are plenty, while there is a dearth of Kidney-wax; the former was able to set a crop after the first setting was destroyed, which the latter variety will not do.

The quality of seeds of the growth of 1891 is above the average both as to vitality and the development of the plants that produced them, and in purity and trueness to type. There has been a continuation of the improvement which has characterized American-grown seed for the past few years, for which we are largely indebted to the work of the trial-grounds of the experiment stations as well as to those of the seedsmen.

A special enumeration of the seed-farms of the United States has been made by J. H. Hale under the auspices of the census bureau (Bull. 111, Sept. 4, 1891). Starting with the establishment of Landreth's seed-farm at Philadelphia in 1784, the industry has enlarged to 596 farms with a total of 169,851 acres devoted exclusively to the business. The acreage of the different seed-crops is as follows:

Field-corn	16,322	acres.	Sweet-corn	15,004	acres.
Bean	12,905	"	Cucumber	10,219	"
Pea	7,971	"	Muskmelon	5,149	"
Squash	4,663	"	Tomato	4,356	"
Potato	4,102	"	Watermelon	3,978	"
Onion	3,560	"	Asparagus	1,437	"
Cabbage	1,268	"	Beet	919	"
Turnip	885	"	Radish	662	"
Carrot	569	"	Lettuce	486½	"
Parsnip	374	"	Pepper	365	"
Onion sets	352	"	Egg-plant	252	"
Spinach	150	"	Kale	105	"
Pumpkin	105	"	Flower-seeds	81	"
Parsley	75	"	Celery	71	"
Dandelion	39¾	"	Salsify	26	"
Rhubarb	25	"	Kohlrabi	19	"
Endive	16	"	Leek	13½	"
Collards	13	"	Okra	13	"
Cauliflower	11	"	Nasturtium	2	"
Corn-salad	1½	"	Cress	1½	"
Celeriac	½	"			

Seed statistics.

More than one-half the farms were established since 1870, and this is an indication that the business, as a whole, is prospering. "So far as reported, there were but two seed-farms in the country previous to 1800 (one of these was established in Philadelphia in 1784, and the other at Enfield, New Hampshire, in 1795), only 3 in 1820, 6 in 1830, 19 in 1840, 34 in 1850, 53 in 1860, 100 in 1870, 207 in 1880, and 200 more were established between 1880 and 1890, leaving 189 unaccounted for as to date of establishment. But as the proprietors of the older seed-farms take great pride in this matter, it is safe to assume that 90 per cent. of the unreported farms have come into existence within the last 20 years." "Of the 596 seed-farms in the United States, 258, or nearly one-half, are in the North Atlantic division, the original center of seed production. These farms have an acreage of 47,813, or an average of 185 acres per farm, while in the North Central division there are 157 farms, with an acreage of 87,096, or an average of 555 acres per farm. The seed-farms of Massachusetts and Connecticut average 142 acres per farm, while those of Iowa and Nebraska are 695 acres in extent, and are producing seeds on a scale of equal magnitude to the other products of that section of the country. Several of these seed-producing farms embrace nearly 3,000 acres each."

The seed business.

"From general information obtained from the seed-farmers and a study of the figures in this bulletin it appears that this branch of agriculture has kept fully apace with the general march of national progress. Prior to 1850 all the seed-farms of the country were in the few northeastern states of the Union, Connecticut and New York for more than half a century producing more seeds than all other states combined; and while each has at present more seed-farms than any other state, the general westward tendency of all that partains to agriculture has stimulated seed-growing on a very extensive scale in the central west and on the Pacific coast. There has been of late a feeling of depression among the growers generally, who, previous to 1883, made exceptionally fine profits out of the business, and were thus stimulated to establish more seed-farms than could profitably find market for their products during the last few years. The general feeling now is that prices must be advanced or some method of production be discovered whereby a greater yield may be secured at less cost of labor."

California. Notwithstanding the heavy crops in California in 1890, the yields were very large this year.

California crops.

The eastward fruit movements from California are indicated by the report of the secretary of the California Fruit Union, from which the following figures and quotations are taken: The total number of carloads of fruit shipped by the union to eastern markets in 1891 was 1,387, against 1,373 in 1890, 991 in 1889 and 851 in 1888. Of these, 654 cars went to Chicago, 258 to New York, 111 to Minneapolis, 94 to Omaha, 54 to St. Paul, 87 to Boston, 55 to New Orleans, 44 to St. Louis, 20 to Kansas City, 9 to Louisville, 1 to Buffalo. "The cherry shipments were much larger than in any previous year, and the results were generally very satisfactory. The shipment of Bartlett pears was very heavy and they generally arrived in good condition, but prices ruled very low and unsatisfactory on account of meeting with competition from eastern Bartletts. The shipment of peaches was not very large and prices were generally low, owing to the large crop of peaches raised in the east, and also to the fact that their crop was early while ours was comparatively late. The grape shipment was heavy, and compared fairly with other years in prices realized." "The prices realized for fruit in all markets the past year have been very low, owing to large crops of nearly all kinds in all places, as well as the fact that California's fruit crop was late in ripening, while the eastern crop was earlier than usual."

The orange crop is probably somewhat larger than that of last year, and the quality is said to be unsurpassed. The citrus industry of California is assuming vast proportions,* and there are almost unlimited possibilities before it. The following figures of the shipments of citrus fruits from southern California for the last season (1890-1), together with those of the previous year for comparison, were compiled by the *Citrograph*:

California citrus fruits.

County.	Boxes.		Cars.	
	1890-1	1889-90	1890-1	1889-90
Los Angeles	632,071	198,695	2,212	781
San Bernardino	487,882	487,000	1,708	1,705
Orange	147,332	112,190	516	307
Ventura	19,475	9,460	68	33
San Diego	18,861	6,600	66	23
Santa Barbara	6,478		23	
Totals	1,312,099	813,045	4,503	2,849

Included in the above lots for 1890-1 are 20,904 boxes (73 carloads) of lemons. The great gain in Los Angeles county, over two years ago, is accounted for by the fact that during the former year (1889-90) "the orchards were badly infected by the scale. Good care and the *Vedalia cardinalis*† have put the orange-groves in good condition again." "Taken as a whole," the editor concludes, "the figures are satisfactory and conclusively show that the great industry is in a thriving condition."

The citrus industry is rapidly enlarging in the central and northern portions of California, also. President P. E.

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*For a succinct account of the citrus and other interests of California, see ANNALS for 1890, 18-28.

†See ANNALS for 1889, 62; 1890, 103.

Platt, of the Sacramento Board of Trade, writes that "it is very pleasing to be able to report a continued development of this industry, and the assured success of the same. During the past three years upwards of 250,000 orange and 50,000 lemon trees were planted in Sacramento county and several counties north and east, and it is gratifying to note that the trees are doing remarkably well, many of them coming into bearing and old orchards showing a continued good yield. It is found that the quality of the fruits is equal to any grown in the southern part of the state."

The raisin crop.

Reports indicate that the raisin crop of California for 1891 will exceed that of last year. Careful estimates place the crop at 1,800,000 boxes, an increase of 300,000 boxes over last year. This increase comes mostly from some 20,000 acres of young vines, coming into bearing this year. The California raisins are constantly gaining favor in the markets, both at home and abroad. It will be profitable to those interested in the development of our raisin industry to read the following account of the methods of growing and curing the Valencia raisins, with which our product competes. The article was contributed to the *Fruit Trade Journal* from a correspondent in Denia, Spain: "The raisin industry dates back to a remote period; in fact it has been uninterruptedly pursued since the middle of the seventeenth century, when raisins are reported to have been shipped to foreign ports from Gandia, though to a somewhat insignificant extent. Exports on a large scale commenced some sixty or seventy years ago, and since then Denia has been the center of exportation from its being favorably situated on the coast, in the middle of the raisin-district. The cultivation of the vineyards and drying and curing of the grapes during this long period have not been improved, owing to the innate perverseness of the growers and farmers, their non-adoption of modern methods and improvements, their stubborn attachment to out-of-date implements. In cultivating the soil they not only use the most primitive implements, but the vines are never irrigated as is the case in the United States, even if irrigation is at hand. In a wet season when abundant rains are prevailing, such irrigation is, of course, unnecessary; but in dry seasons the vines are not sufficiently developed to produce first-class fruit. Since the mildew appeared in Europe, the vines have been infested with it, and of late years to a very great extent. For instance, this year (1891) the mildew has made such havoc among the vines, that the crop will be some 10,000 to 12,000 tons shorter than last year. For this result the farmers are greatly to blame. It is well known that sulphur is a sure remedy when of good quality and properly employed, but the sulphur generally used here is of inferior quality and not employed in sufficient quantity. The majority of growers sulphur their vines only once, and do this too late, when the havoc is already done by the mildew. The sulphuring is generally performed in June, when the berries have set, and it ought to be done before and after the blooming at least two or three times. The important operations of scalding and drying are neglected to such an extent that the quality of the raisins is seriously affected. Many growers collect the grapes before they are sufficiently matured, thus producing raisins which consist only of skin and seeds, containing little or no pulp. Too frequently the scalding is improperly performed, as the growers do not rinse or wash the grapes before dipping them in lye. The grapes, after being scalded, should be placed on platforms made of reeds, and exposed to the sun ; but many growers and farmers are too poor or neglectful to provide the necessary platforms, and dry the grapes on the soil between the vines or elsewhere on the bare ground, thus not being able to cover the grapes during the night or in case of bad weather setting in. By not rinsing the grapes and by drying them on the soil, much dirt adheres to them, which is of course a great objection to these raisins. They are able to retain their keeping quality for a short period only, and are apt to mold and lose their flavor. There is no doubt that the quality of the Valencia raisins in general could be considerably improved, were more care taken in their cultivation, scalding and curing by the growers and farmers.''

Valencia raisins.

The prune, peach, apricot, and other crops of California were large this year, and they are constantly increasing in importance in the markets of the world. The total amount of green deciduous fruits shipped from the state up to December 1, 1891, is estimated at 78,600,000 pounds. Dried fruits are estimated at upwards of 50,000,000 pounds, although it is impossible to determine what the final output of the year will

Other California crops.

reach. It is gratifying to know that the California prune is winning a reputation. This is said to be due to the method of curing. The California product is dried in the sun, while the foreign prune is cooked in the curing process. The olive, also, is yearly attracting more attention.

The fig-wasp.

The most interesting departure in California horticulture for the year is the successful importation of the fig-wasp *Blastophaga grossorum* (*Cynips Psenes, Linn.*) from Syria. The fig is a hollow fleshy body, upon the interior of which are borne unisexual flowers, the staminate or male flowers being confined to a narrow area near the opening and not usually maturing until the pistillate flowers have passed their receptive stage. The fig is therefore practically incapable of pollinating itself, yet it is commonly supposed that early maturity of the fruit and the development of the best quality depend upon the fertilization of the minute flowers. The wild fig or caprifig under certain conditions bears an abundance of pollen, and this and the cultivated fig practically stand to each other in the relation of male and female plants. The fig-wasp lives in the caprifig, one brood depositing an egg in the ovary of each pistillate flower and then dying within the fig. The larva develops at the expense of the ovule, and the resulting wasp subsequently pollinates the flowers of a succeeding crop of figs during the same year. In most fig-growing countries, the growers plant the caprifig among their figs or more commonly hang branches of it in the trees. This process of pollination is known as caprification, and a large special literature exists upon the subject.* It is one of the most interesting instances known of the mutual adaptation of insects and flowers. It is still a moot point if caprification is always essential to the best results in fig-culture. Several important researches have pronounced against it, but it nevertheless appears to possess decided value in many instances. Caprification is employed in the growing of the Smyrna figs of commerce, and it is true that the California product is inferior to them, selling for only about a third as much. The importation of the fig-insect, therefore, becomes an event of great interest, and the experiment will be eagerly watched by scientists and horticulturists alike. The insect was introduced by James Shinn, of Niles,

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*The student will find a succinct account of caprification in Muller's Fertilization o Flowers, 521.

California, July 2. J. Bliss, a missionary at Lokia, near Smyrna, shipped a dozen caprifig fruits containing the eggs of the insect. These arrived at New York July 18 and at San Francisco July 25. Some live insects and unhatched eggs were found in the box upon its arrival, and they were colonized in a large caprifig growing upon Mr. Shinn's place. The insects appear to have thrived thus far.

Apples in California.

It is commonly supposed, especially throughout the east, that California cannot grow good apples; but Leonard Coates has recently combatted this opinion before the California State Horticultural Society, and has shown that in certain regions apples of good quality are easily grown. He predicts than "in ten or fifteen years from now the state of California will produce apples in great quantities for export, although now in but very limited supply, and such that will command the admiration of any market; and they need not all be of what are known as the old standard sorts, for many newer varieties better suited to a mild climate are being introduced from the southern and southwestern states, and we are originating a number of seedlings which are peculiarly suited to our climatic conditions."

Pacific Northwest. Oregon and Washington are beginning to attract attention in horticultural directions. The following summary of their horticultural status is furnished for this occasion by Professor E. R. Lake, of the Agricultural College of Washington: *

Pacific Northwest.

"Unusual activity has marked matters horticultural in this section during the past year. Great progress has been made in all directions. The organization of many local societies, associations and clubs for the discussion of subjects pertaining to our horticultural interests has been, probably, the leading factor in this advance. The advent of much active young blood from both the east and south, has done no little to awaken a just appreciation of our horticultural resources. Yet, notwithstanding all this, we are sadly negligent of much that pertains to our best interests; we are woefully behind in much of the work that marks the intelligent orchardist and gardener, but at the present rate of progress we may reasonably expect to be in sight of the advance guard at the World's Fair.

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* See also ANNALS for 1890, 28, for an account of Washington horticulture.

"At present our horticultural education is looked after by two agricultural colleges and experiment stations—Washington's just being organized; two state boards of horticulture; one state horticultural society, and twelve local organizations. The meetings, exhibitions, discussions and reports of these various institutions have been interesting and valuable, and as the working organization becomes more effective much better results may be looked for. The customary aversion of the average cultivator to books and book-men has had much to do with the apathy that has characterized our horticulture during the past decade, and it will require a vigorous effort to convince our practical workers of the great value of scientific attention.

"Then the fact that capital has not been drawn into the work of building up large orchards and gardens, thereby stimulating smaller plantations, has been a serious check on past development of this field. This absence of large orchards has also had another effect even more restraining than the above, in its influence upon transportation. Rates on fruits, evaporated products excepted, are even now so high as to restrict shipments greatly, but as yet the total product of merchantable fruit is not sufficient to warrant transportation companies in making special rates. In the near future when the young orchards, some of them embracing several hundred acres, begin to bear, the amount of fruit of a marketable quality will be such as to enable producers to secure favorable rates to distant markets; but until this time comes it will require much effort to induce the older residents to plant, except for home use, because they cannot see an immediate profit in growing for market.

Horticulture in the Northwest.

"Crops have been up to the average the past year, except prunes. This fruit witnessed its first partial failure in this section; this, however, only extended to one variety—the Italian—and is chargeable to late cold rains, which seriously damaged the crop at a critical point.

"Markets have been firm for good fruit, and little inferior produce has been accepted because an ample supply of the best was to be obtained, save perhaps, apples, which have been seriously affected by the codlin-moth worm, the result being much inferior fruit and high prices for clean fruit. The average ruling wholesale prices for the various fruits have been :

Strawberries	5	cts.	per pound.
Currants	5	"	"
Gooseberries	3½	"	"
Grapes	5 to 7	"	"
Apricots	4	"	"
Pears	1	"	"
Raspberries	7	"	"
Blackberries	5	"	"
Cherries	6	"	"
Peaches	2½	"	"
Nectarines	3½	"	"
Plums	1½	"	"
Prunes, green	2	"	"
Apples	45	"	per box.

Dried prunes are held at 6 to 8 cents as against 10 to 12 cents last year. This is due to the abundant crops east, which have shortened the demand for the dried product.

“Levy, Spiegl & Co., fruit-merchants of Portland, Oregon, write me as follows : ‘The prices we name herewith are the highest and lowest prices these various items sold at this year, although they do not refer to this season's crops alone. This season prices have ruled low, while early in the year prices ruled comparatively high, making the average for the year very good.

Potatoes	$0 40	to	$1 15	per 100 lbs.
Sweet Potatoes	1 75	"	5 25	" "
Onions	60	"	2 50	" "
Carrots Parsnips Beets Turnips	40	"	1 00 and $1 25	per sack.
Cabbage	40 per doz.	to	$1 75	per 100 lbs.
Cucumbers	05 "	"	75	" doz. for early stock.
Cauliflower	50 "	"	1 25	" "
Celery	40 "	"	90	" "
Squash and Pumpkins	60 "	"	1 50	" "
Tomatoes	02	to	$0 30	per lb. for early stock.
Rhubarb	03½	"	10	"
Beans	02½	"	20	"
Peas	02½	"	15	"
Peppers about	06			" average.
Lettuce	05	"	35	per dozen heads.
Corn	05	"	55	" ears.
Melons, Water	1 50	"	5 00	"
Melons, Musk	50	"	4 00	"

"Varieties and cultural methods. No extended and systematic work has been done in testing varieties or cultural methods. Our early orchardists planted a few of the more hardy varieties, gave them no care, and reaped good crops, which sold well; but our later orchardists find that hardy varieties are not all-sufficient, and that some care must be given trees if good returns are expected in these days when cheap and rapid transit bring us into close competition with other sections. Thus, at present we are largely involved in experiment. A few varieties are established, but the majority are on trial. Our soil and climate are so varied that very different results are obtained with the same variety, in localities only a few miles apart, but having different aspects, soil and surroundings. The most annoying feature of this part of the subject is the wretched condition of the nomenclature of our fruits. Frequently at our exhibitions and fairs the same variety parades under several names, while the opposite is as frequently true. Much of this is due to the fact that well-known fruits in the older states change color, size and flavor when grown on our basaltic soils and in this peculiar climate. As yet the simplest methods of culture are followed, only the more progressive orchardists recognizing that clean cultivation and thorough pruning are necessary to best results. Each of several sections has its favorite varieties. Generally speaking they are: *Apples*—Red Astrachan, Williams' Favorite, Gravenstein, Tompkins King, Ben Davis, Baldwin, Northern Spy, Twenty Ounce, Esopus Spitzenburgh, Fall Pippin, Canada Reinette, Yellow Bellefleur, Golden Russet, Monmouth, McAfee and Blue Pearmain. *Pears*—Bartlett, Duchesse d'Angouleme, Winter Nelis, Vicar, Louise Bonne de Jersey, Flemish Beauty, Aujou, White Doyenne. *Peaches*—Alexander, Hale's Early, Early Crawford, French, Early Charlotte, Salway, Cox's Cling, Indian. *Plums*—Peach, Yellow Egg, Columbia, Reine Claude. *Prunes*—Italian d'Agen, Hungarian, Coe's Golden Drop. *Cherries*—Napoleon, Luelling, Bigarreau, Black Eagle, May Duke. *Blackberries*—Lawton, Kittatinny, Everbearing. *Raspberries*—Cuthbert, Gregg, Red Antwerp, Souhegan. *Currants*—Cherry, Fay, Red Dutch and Victoria. *Gooseberries*—Oregon Champion, Industry, Downing. *Strawberries*—Wilson, Clarke, Gandy, Jucunda, Big Bob, Sharpless. *Grapes*—Concord, Delaware, Sweet-

Fruits in the Northwest.

water, Flame Tokay, Black Spanish, Chasselas Rose, Worden.

"Of nuts little can be said save that experiments are being carried on in several sections with filberts, chestnuts and walnuts.

Vegetables in the Northwest.

"Vegetables grow to perfection as well as fruit. Few are grown for other than the home markets. Some potatoes and onions are shipped, also a little horse-radish. All the ordinary vegetables flourish throughout the whole section. Prices are good, as but few give attention to growing for market, fruit-growing paying better and being much more attractive to the average cultivator. With the rapid growth of cities, however, more attention will be given to this phase of the subject. Celery and cauliflower, those choicest of vegetables, grow to perfection here.

"The horticultural resources of this section are just becoming apparent, and in a few years, when the young orchards begin to bear, eastern people may expect to see other fruits than those of California."

Apple and pear-culture are promising industries for the Pacific northwest. The proper selection of varieties for a new country is one of the most difficult problems connected with its horticultural progress, and any experience in this direction is useful. The following notes upon apples and pears are extracted from editorials in the *Northwest Horticulturist* for October and November, 1891:

Apples in Washington.

"The climate of this region is favorable to the production of nearly all standard varieties of winter apples which are produced in the middle and eastern states; and so far as the size and flavor of the fruit and the productiveness of the trees are concerned, this region excels the states east of the Rocky mountains. The keeping quality of the same varieties is not so prolonged here, owing to the moister atmosphere and milder temperature. Baldwin and Northern Spy, late keepers in Michigan and the eastern states, are early winter apples in western Washington, and so with a number of other varieties. The ideal profitable winter apple is of good quality, medium size and red color, and is a late keeper, considering that the tree is productive. If there is no one kind which fulfills these qualities, then the variety which comes nearest to this standard must be chosen. In eastern Washington the same kind of winter apples will keep longer than those raised in the western part. The mild climate calls for a different variety from those generally considered late keepers, in order to keep until spring. The Northern Spy and Baldwin are profitable, but if an apple of the same quality and color could be kept for two months later than is their keeping-season here, more profit would be realized by the grower than when he has to market this fruit earlier, and which in drier and colder climates keeps for several months. The English Russet possesses the qualities of the ideal, except in color, which may be considered as less objectionable for a late winter apple than for those marketed early. The English Russet has been cultivated and produced for a number of years on Puget Sound with satisfactory results. The trees grow very straight, and form upright heads, and the wood is smooth and of a reddish brown; fruit of medium size, roundish and very regularly formed; skin pale greenish yellow, about two-thirds covered with russet, which is thickest near the stalk; flesh yellowish white, firm, crisp, with a pleasant, mild, slightly subacid flavor. This may be considered a good market sort.

Apples in Washington.

"The Lady's Sweet has also the qualities of an ideal apple, except the color, but it has stripes of pale red, and may be considered one of the finest winter sweet apples for the dessert known or cultivated in this country. More of this variety should be planted in both eastern and western Washington. The wood of the tree is not very strong, but it grows thriftily and bears very abundantly, making a round, spreading head. The fruit is large, roundish, narrowing pretty rapidly to the eye. The skin is smooth and yellowish if grown in the shade, with broken stripes of pale red. The flesh is greenish white, exceedingly tender, juicy and crisp, with a delicious, sprightly, agreeably perfumed flavor. It keeps, without shriveling or losing its flavor, until spring.

"The Yellow Newtown Pippin, or Newtown Pippin, possesses the qualities of the ideal apple with exception of color, and in western Washington has the reputation of being a light bearer, but it is very satisfactory in the Yakima and Walla Walla districts. It is a native of Long Island, and requires a pretty strong, deep warm soil to attain its full perfection; and in the orchard it should be well manured every two or three years. While young the tree is remarkable for its rough bark. Fruit is of medium size, roundish, somewhat oblique; when ripe it is yellow, sometimes with red cheek and a smooth skin. Flesh is a greenish white, crisp, juicy and rich flavor. The tree is an excellent bearer, but if not healthy the fruit will be spotted. It is grown more in eastern than in western Washington, and there it also keeps late in spring. The Blue Pearmain has the required color, but is not so late a keeper as those above mentioned. The tree is also a more moderate bearer. It is grown more in the southeastern part of the state than elsewhere in Washington. The fruit is of the largest size, roundish, slightly conical, with stripes of dark purplish red over a dull ground, and appearing bluish from the white bloom. Flesh yellowish, mild, rather rich, aromatic and very good. The Monmouth Pippin (Red-Cheeked Pippin) is produced to some extent in southeastern Washington, but it is only a moderate keeper and of pale yellow color. It is a native of Monmouth Co., N. J.—a tree of moderate upright growth and productive. The fruit is subacid and very good. The Esopus Spitzenburgh comes nearest being the ideal apple for the entire northwest region than any other variety yet known. In eastern Washington it keeps later than on the west side of the Cascades, and is therefore more profitable for the grower; but it is generally considered by all good judges equal to the Newtown Pippin for profit, and unsurpassed as a dessert fruit by any other sort. It originated at Esopus, on the Hudson, N. Y. The tree has slender shoots, and when in bearing it has long and hanging limbs. The fruit is large, oblong, tapering roundly to the eye; skin smooth, nearly covered with rich, lively red, with distinct yellow-russet dots; flesh yellow, rather firm, crisp, juicy, with a delicious, rich, brisk flavor. With proper cultivation and care, this apple will be one of the most profitable for western Washington for some time to come.

Apples in Washington.

"The Northern Spy, the ideal apple east, only lacks the keeping quality to be equally considered in western Washington, being an early winter apple; it sells for the highest price of any in its season, and is fairly productive. It originated on the farm of Heman Chapin, of East Bloomfield, near Rochester, New York. The tree requires high cultivation and open heads to let in the sun, otherwise the fruit is wanting in flavor, and apt to be imperfect and knotty. The fruit is large, roundish, oblate, conical; skin thin, smooth in the shade, greenish or pale yellow in the sun, covered with light and dark stripes of purplish red; flesh white, fine-grained, tender, slightly subacid, with delicious flavor; core large and open, This fruit keeps later here than the Spitzenburgh. The Winesap is one of the varieties largely planted by the old settlers of the north Pacific coast. Both in Oregon and Washington much fruit of this variety has been produced. It is generally ready for market about Christmas time. The tree is productive, bears early and holds its fruit well until late; it thrives well in a sandy soil. The fruit is of medium size, rather roundish, oblong; skin smooth, of a fine dark red with a few dark streaks; flesh yellow, firm, crisp, with a rich, high flavor—a fine cider-fruit. This variety is most profitable in southeastern Washington. The Baldwin, the well-known standard apple for the eastern states, is also an early winter apple in western Washington and Oregon, where it is grown to some extent. There being several varieties ready for market about the same time, and the tree being a moderate bearer, it is less noted than where grown in a colder and drier climate.

Apples in Washington.

"The varieties above mentioned are profitable for the Pacific northwest. Trees are generally prolific over this entire region, and in eastern Washington the fruit grows to immense size and retain to a considerable extent the late-keeping quality. For western Washington there is demand for a good red, medium-sized apple that will keep as late as will the Yellow Newtown Pippin. The ideal apple will grow on a great variety of soils, but it seldom thrives on very dry lands, or soils saturated with moisture. Its favorite soil in all countries is a strong loam of a calcareous or lime-stone nature. A deep, strong, gravelly, marly or clayey loam or a gravelly subsoil, produces the greatest crops and highest-flavored fruit, as well as the utmost longevity of the trees. Some parts of Orcas Island, San Juan county, abound in such soil. The calcareous or limestone nature predominates, and it is found that trees growing there are thrifty, smooth-barked, bear abundantly, and the fruit is of a high color and quality. It is also found that these trees are not being attacked to any great degree by injurious insects."

Of pears, "the six varieties recommended by the Washington Horticultural Society, for general cultivation, are as follows: for summer—Giffard and Bartlett; for fall—Anjou, Louise Bonne de Jersey and Dix; for winter—Easter. Since then new varieties have been brought forward for cultivation, such as Idaho, Erwin and Columbian, which are now being tried in the various districts of this region. But the Bartlett, Anjou, Louise Bonne and Easter are sure bearers, prolific, trees thrifty, fruit delicious, and always bring a good price on the market.

"As has been previously stated, the trees are vigorous growers, fruitful and bothered scarcely any by insects or blight in this region. S. W. Brown, of Vancouver, Wash., in an article to the *Tacoma Commerce*, of November 23, 1886, states: 'If there is a country on the face of the globe where pears can be raised more successfully than in this, I have never heard of it. It is a question in my mind which there is the most money in, the Bartlett pear or the Italian prune. Were I going to plant a large orchard for the purpose of raising fruit to sell, I think I should divide it chiefly between the Italian prune and the Bartlett pear, in about equal parts.' Good Bartlett pears sell from $1 to $1.50 per box (50 lbs.); other varieties vary according to quality and season. In New York it is estimated that a young orchard five years from the time of planting should produce from $50 to $75 per acre, and when ten years old the trees should produce fruit to the amount of $400 per acre; at 15 years the receipts should be from $600 to $800. At Olympia, Wash., trees four years old have produced 50 pounds per tree; and instances are related where trees in this country have produced from 20 to 25 bushels each, and the fruit sold at $1.25 per bushel. These are exceptional cases in favorable locations; but as a rule large crops are produced each season, which, if properly cared for, will bring profitable returns to the growers of the Pacific northwest."

Pears in Washington.

Canada is extending her fruit-growing interests in southern Ontario, and eastward near the sea-coast. Nova Scotia has long been famous for its apples, the Annapolis valley being generally regarded as the best apple-country on the Atlantic coast; but it is not generally known that it contains a large and important cherry-growing district, the Bear River region. Even in the northwest territory there are regions where small-fruit growing will some day attain to importance. The following geography of the fruit-growing regions of Canada is part of a paper by A. M. Smith upon "Progress of Fruit-culture in Canada" before the Western New York Horticultural Society, 1891:

Pomology in Canada.

"Now take a map of Ontario and begin at its eastern boundary and follow up the St. Lawrence river—whose shores are famous for its Snow, St. Lawrence, Pomme Grise, MacIntosh Red and other hardy apples—to Kingston; and then take the north shore of Lake Ontario—not forgetting to trace around the Bay of Quinte, where lies Prince Edward county, the home of the apple—on up to Hamilton, around Burlington bay; then down the south shore of Ontario to the Niagara river; up the river to Lake Erie; then up the north shore of that lake to Detroit river, taking in the Niagara peninsula—famous for all kinds of fruit—and the counties of Essex and Kent, which will soon be equally famous; thence up the river and Lake St. Clair shore to Huron; around the south and eastern shores of that lake and Georgian Bay; through the counties of Lambton, Huron, Grey, Bruce and Simcoe—all noted for their long-keeping apples—and you have traversed a shore-line of over 1,000 miles in length adapted to apple-culture. Allowing this belt to be ten miles wide, and one-tenth of it in suitable condition for orchard-planting, you have 1,000 square miles, or 640,000 acres, which, with the shores of small lakes and rivers in the interior, where apples grow in abundance, could be easily swelled to over a million acres of the best apple-land in the world. Nor is all the apple-country of Canada confined to Ontario. Nova Scotia, particularly the Annapolis valley, has thousands of acres already in this fruit, and thousands more which might be utilized. The quality of the apples grown there, particularly the Gravenstein, have a world-wide reputation. Many sections of Quebec, Prince Edward Island and New Brunswick are also adapted to the apple. British Columbia, on the Pacific coast, is opening up with great prospects as a fruit-country—apples pears, plums and cherries being produced in abundance, and in some sections grapes and peaches. The majority of the area of apple-land that I have described in Ontario is equally adapted to plum-culture, and about one-half of it to pears and cherries; and some two or three hundred miles along the shores of Lakes Erie and Ontario to grapes. Quite a belt on the south shore of Ontario, in the Niagara district, and another on the north shore of Lake Erie, in the county of Essex, grow peaches in perfection. Small fruits flourish all over the province."

Outlying regions.

Outlying regions. Any one who is familiar with the horticulture of America must have been struck with the fact that almost every part of the United States is found to be adapted to fruit-growing in one form or another, as soon as the experiment is intelligently tried. The exhibits of apples at the meeting of the American Pomological Society in Washington this year showed that a considerable number of varieties are adapted to our extreme northern borders, as Aroostook county, Maine, and the cold regions northwest of the great lakes. The horticultural possibilities of the newer western states are yet unknown, but there is every reason to expect that large regions will be found to be peculiarly adapted to special fruits. Parts of New Mexico and Arizona give great promise in grapes, raisins, figs, citrus-fruits and olives. Montana, in which agricultural and horticultural pursuits are almost entirely undeveloped, gives promise of affording some good apple districts. The *Montana Stockman* recently published the following note as an earnest of future capabilities: "A quantity of apples as large as saucers, exhibited by Secretary Ramsey, of the World's Fair Commission, ought to convince the most sceptical that Montana is a fruit country. These apples were grown in an orchard about two miles from Missoula. We have seen no samples of fruit in the east that looked more inviting to the taste. Did those interested in fruit-growing in Montana exhibit enough interest to effect the organization of a horticultural society, it would be a question of a few years only before our pleasant valleys would blossom like a rose with fruit of the most luscious quality. If fruit-growing is retarded, it is not because the climate and soil are unfavorable, but because the proper degree of intelligence is not exercised in the selection of trees. A horticultural society would bridge this difficulty and enlighten the people as to the varieties best adapted to this climate and the soil conditions. While Montana will doubtless make a fine fruit-exhibit at the World's Fair, 1893, it might have easily wrested the laurels from many less favored regions had the tree problem received the attention it merits."

Fruits in Montana.

The nursery statistics.

The *nursery business* is the subject of Bulletin 109 (Sept. 2, 1891) of the census-bureau, by J. H. Hale. The enumeration shows that there are 4,510 nurseries in the United States, all but two of which have been established since 1800. These nurseries occupy 172,806 acres of land, and represent an invested capital of $52,425,669.51. They give employment to 45,657 men, 2,279 women, and 14,200 animals. The grand total of plants growing in these nurseries in the census year, 1890, was 3,386,856,778! Of this vast number, 518,016,612 are fruit-trees, 685,603,396 grape-vines and small fruits, and the remainder are mostly ornamentals. The following table shows the acreage devoted to the leading species and the total number grown:

Plants.	*Number of acres.*	*Average number grown per acre.*	*Total number grown.*
Apple	20,232¾	11,890	240,570,666
Apricot	269	11,689	3,144,466
Cherry	3,690	10,362	38,236,254
Fig	63¼	11,734	742,200
Lemon	79	6,998	552,841
Lime	6	10,688	64,125
Nectarine	50	13,054	652,679
Olive	26	12,616	328,016
Orange	607½	7,191	4,368,322
Peach	3,357	14,861	49,887,894
Pear	6,854¼	11,266	77,223,402
Plum	7,826½	11,307	88,494,367
Pomelo	14	5,764	80,700
Prune	588	12,964	7,623,000
Quince	518	11,675	6,047,680
Nut	1,370½	10,072	13,803,006
Deciduous trees*	12,342	105,121	1,297,408,257
Evergreen trees	8,644½	95,094	822,038,324
Hardy shrubs	2,881½	15,989	46,072,530
Rose	346½	11,295	3,913,653
Grape-vines	5,673	28,052	159,139,248
Strawberry	4,433	61,157	271,108,253
Raspberry	5,756⅓	15,025	86,487,491
Blackberry	4,889⅓	21,539	105,310,810
Currant	2,021	24,432	49,376,805
Gooseberry	1,009½	14,047	14,180,789
Miscellaneous fruit-trees and plants.	1,477	....	....

The nurserymen of the United States issued in 1890 3,299,-

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* Includes forest trees and ornamental trees.

895 wholesale catalogues, 9,556,980 retail catalogues, and paid $512,054.61 for newspaper advertising and $394,163.76 for postage.

"At first thought it would seem that the annual production of all these millions of trees and plants would soon overstock the country, but it is a sad fact to contemplate that damage in transit and climatic conditions, coupled with the carelessness of many planters, result in killing nearly one-half the plants and trees sent out each year, and further neglect results in the loss of one half of those remaining before the end of the third year; and it has been estimated by some horticulturists that of all the trees set out not more than one in twenty ever comes to full fruiting. This is not so much on account of soil and climatic conditions as from ignorance and carelessness of the average planters; for skilled orchardists have little trouble in bringing 90 per cent. of all trees planted into full fruitage. This loss of trees, coupled with the steady growth of the country and the increased taste in horticultural matters, must of necessity cause the demand for nursery products to be even greater in the future than in the past. Twenty years ago a fruit-orchard fifty acres in extent was considered a wonder; now in nearly every state apple, pear and peach-orchards of 100, 200 and 300 acres are being planted, while in Georgia and California there are many peach-orchards of 1,000 or more acres each. The greatest and most steady demands, however, will ever continue to be for plants and trees for the home ground and the fruit-garden. The latter, a luxury a few years ago, is fast becoming a recognized necessity; and as greater attention is being given it each year it can not fail to help the nursery trade, and so it is expected to grow and prosper even more in the future than in the past."

The nursery business.

The general tone of the figures shows that the nursery business is prospering. "While a few eastern states show a slight falling off in the production of some kinds of nursery-stock, Vermont is the only state to show a falling off in all lines of production. Maine also shows a considerable decrease in several lines. Florida shows a decrease in orange-tree production, brought about by the discouragement of planters by the hard freeze of 1886; but with these few exceptions the increased production is from 15 to 300 per cent., being greatest in the states of the North Central division and on the Pacific coast. With this greatly increased production has come about a considerable decrease in the selling-price, so that while the nurserymen appear to be prosperous financially, greater knowledge in the art of production and better methods of culture enable them to produce better stock at less cost—conditions all favorable to the planter and not in the least discouraging to the nurseryman who understands his business.''

New fruits.

New types of fruits. Perhaps nothing shows so forcibly the vitality and activity of American horticulture as the astonishing number of new types of fruits introduced during the last few years from foreign countries or secured from our own woods. Even a list of them is scarcely possible at this time. Florida and southern California have drawn very heavily upon the subtropical and even tropical fruits of various parts of the world. The whole country has been much enriched by the introduction of many Japanese fruits. In all this list of newcomers it is a significant fact that there appears to be not one which has failed to find some congenial place, and to make friends. This is proof that our country possesses the possibilities of a wonderful and varied horticulture. Perhaps the most encouraging feature of this acquisition of new types of fruits is the growing desire to rescue and improve native species. This is nowhere better illustrated than in the native plums, which have already assumed great commercial importance. Among the newer wild types may be mentioned the following as particularly interesting and promising: Several species of grapes, apples, the dewberries, juneberry, Crandall currant, buffalo-berry, elderberry and western strawberry.

The recent native grape interest has been kept clearly before the public by T. V. Munson, of Texas, and others, and it needs no further comment here. The native apples have been discussed and described by the present writer* during the year. Our native crabs east of the Rocky Mountains clearly belong to three species, *Pyrus coronaria*, *P. angustifolia* and *P. Ioensis*. Of these, *Pyrus Ioensis* is far the most important to the cultivator, apparently, and there is much reason for expecting profitable results from its amelioration. Still a fourth species, *Pyrus Soulardi*, was described. This includes the Soulard crab and other promising but unnamed sorts, some of which are apples of good size and attractive appearance. Specimens have been received this year of an unnamed wild form of this species measuring nearly two and a half inches in diameter. The botanical status of this species is not clearly determined. There is much reason for supposing it to be a hybird between the common apple and *Pyrus Ioensis.* But whatever its botanical position, its horticultural merits deserve to become better known in the northwest, where all attempts towards progress in apple-culture must be made upon the hardiest stocks.

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*American Garden, xii. 469 (Aug. 1891).

Wild apples.

The dewberries have recently been fully discussed by the present writer in a bulletin of the Cornell Experiment Station.* A dozen varieties, representing two distinct species, are known to cultivation, and some of them already possess considerable importance. The juneberry or service-berry (*Amelanchier Canadensis* var. *oblongifolia*) has been before the public for several years, and in point of hardiness, vigor and productiveness deserves to rank high. The only named variety appears to be the Success, introduced by H. E. Van Deman, chief of the Division of Pomology of the United States Department of Agriculture, and who has given me the following account of its history:

Dewberries and Juneberry.

"In December, 1873, I was traveling on horseback from my home in Kansas to the annual meeting of the State Horticultural Society, and learned by accident of the whereabouts of a fruit, growing in a man's garden, that was called huckleberry. On my way home I hunted up the place and found the bushes. I was told that this so-called huckleberry bore abundantly every year, and that it had been brought from Illinois to that neighborhood. I afterwards learned that an old man had brought seeds of the dwarf juneberry from the mountains of Pennsylvania to Illinois, and from them grew this variety. When he and his children went to Kansas, about 1868, they took along a stock of the plants, and part of them were set at the place where I found them. I had no trouble in securing a few of the plants, which I immediately took home and set out, and the next year, when the bloom appeared on them, I learned by consulting the botany that it was amelanchier. The plants grew so well that I went back the next year and got several hundred more and planted them at my home. All of them grew, and I soon had a large plantation. About this time I found other varieties of the dwarf juneberry in cultivation in different parts of Kansas, and got plants which bore, and on comparing the fruit with the one I first got, I thought the first one the best; and as some people discouraged the cultivation of some of the varieties because of their rather inferior fruit, I named my variety 'Success.' About 1878 I began to sell the plants, under the name Success; and until I sold the larger part of my stock some three years ago, to J. T. Lovett of New Jersey, I had sold more than ten thousand plants of this variety."

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*Bull. 34, Cornell Exp. Sta. Nov. 1891.

Crandall currant.

The Crandall currant (*Ribes aureum*) was intruduced in the spring of 1888 by Frank Ford & Son, Ravenna, Ohio, who obtained the stock of R. W. Crandall, of Newton, Kansas. *Ribes aureum* has long been cultivated as an ornamental plant under the names buffalo-currant, Missouri currant, flowering currant, and *Ribes fragrans*. It had also been cultivated for its fruit before the appearance of the Crandall, but it had passed out of notice. The species, as represented in the Crandall, certainly has promise of usefulness.

The buffalo-berry (*Shepherdia argentea*) was introduced in the fall of 1890 by G. J. & L. E. R. Lambrigger of Big Horn City, Wyoming. During the winter of 1890-1 it was brought prominently before the public.

Elderberry.

The elderberry (*Sambucus Canadensis*) was introduced independently in 1890 by Frank Ford & Son, and D. Brandt, Bremen, Ohio. The stock introduced by the Fords was not named. Mr. Ford writes that he "did not propagate it for sale, but dug the roots from clumps that produced large fruit. We sold very few plants, and shall not catalogue it again until we can propagate stock from a few plants which I know, and which produce berries nearly one-fourth inch in diameter." The stock introduced by Brandt was called the Brainard. It was first discoverd in a thicket, in Fairfield county, Ohio, by G. W. Brainard.

The Oregon Everbearing strawberry was introduced in 1890, by Samuel Wilson, of Mechanicsville, Pa., and D. Brandt of Bremen, Ohio. There is nothing in the descriptions of the variety to indicate its species. For two seasons I have grown a wild strawberry from Oregon, which is *Fra-*

garia Chilensis; and it is probable that the Everbearing is the same, for among Oregon strawberries it is the species most likely to attract the attention of a horticulturist. *Fragaria Chilensis* is a low-growing species, with stout and villous scapes, thick and firm leaves, which are smooth and more or less shining above. In our garden, ripe fruits appeared this year July 5, and continued to be produced some time afterwards. The fruits are of medium size, red, in shape like common garden sorts of the Manchester type, with the seed (or fruits) appressed, but not sunken in pits. *Fragaria Chilensis* has been cultivated in the eastern states before, the Princes, among others, having had it many years ago. Its disappearance indicates that it must have possessed no superlative merits for cultivation in the east. The following remarks concerning the wild strawberries of California, which are the same species as those of Oregon, are from a paper by Emory E. Smith, before the California State Horticultural Society : "Two species of fragaria are indigenous to California. *F. Chilensis* (identical with the Chilian species), which is found close along the coast in the northern counties, has perfect flowers and leaves which are smooth and shiny on their upper surface. This is the species which grows in such profuson at the Presidio, Cliff House, Point Bonito, etc. *F. Californica*, which is quite generally distributed throughout the interior of the state, differs from the *F. Chilensis* in appearance, by having sparingly villous leaves, which are not shiny on the surface, as with the other species. It seems that but little attention has been given the wild strawberry on the Pacific coast, and the information obtainable regarding it, both from botanical and horticultural standpoints, is exceedingly meagre. From observations made, I am led to believe that both species can be greatly improved by cultivation, and that they may be the most promising of our wild fruits. I have noticed in several localities vines of both species which were thriftier and produced much larger and finer berries than the average. These were doubtless undefined varieties of nature's production, and clearly demonstrate that both the species are capable of great improvement. The necessity of constantly irrigating the improved varieties of strawberries which have been imported into California has been a great drawback to the general pro-

Ever-bearing strawberry.

duction and use of the fruit in the home garden. In studying the localities in which our native berries are found, especially *F. Californica*, it has occurred to me that the necessity of irrigation might be overcome by selecting and hybridizing these varieties, which naturally grow in the dryest and most unpromising locations. Another point to be considered is the delicous sweetness and delightful aroma of our native berries, both of which qualities it is possible to perpetuate. This subject of quality is of very great importance and has not received proper consideration at the hands of California berry-growers. A large proportion of our strawberries grown by irrigation, while large and finely colored, are to the educated palate but a mass of subacid pulp.* * * * As to the length of fruiting-season of our native strawberries, I am unable to speak with accuracy; but the range is very wide, and, under cultivation, in favorable circumstances, they would fruit for nearly the entire year. Berries have been picked from *F. Chilensis* in favorable seasons, in the neighorhood of San Francisco, from January until August; and I have found what I suppose, without careful examination, to be *F. Californica* fruiting upon the bay side of the summit of the San Mateo mountains in the middle of July. The latter vines were very abundant, and were growing in the brush and in the hard, open ground, up to within a few feet of immense redwood trees. The subject of improving our native fruits is of great interest; and it is hoped that intelligent experiments will be much more common in the future among our progressive horticulturists than they have been hitherto."

Western strawberries.

New types of vegetables are not numerous. Perhaps the most important new types of recent years are the chorogi, or *Stachys Sieboldi* (better known as *Stachys affinis* and *S. tuberifera*), introduced to America in 1888, and the pepino (*Solanum muricatum*), introduced in 1882. The chorogi is a native of China and perhaps also of Japan. It was introduced into France in 1882 from Pekin. It is a mint-like plant producing subterranean edible tubers. The pepino was introduced into the United States from Guatemala by Gustav Eisen. It is a native of Peru, and was introduced into Europe over a hundred years ago.* A small form of the muskmelon species (*Cucumis Melo*) has come into cultivation

New vegetables.

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* For full accounts of chorogi and pepino, see Bull. 37, Cornell Exp. Sta. Dec. 1891.

within the last few years under a variety of names, as Garden Lemon, Melon Apple, Vine Peach, etc. This was described and figured by the present writer in 1889 under the name of Orange Melon.* Two or three luffas have been grown in American gardens during recent years, one of which, the dish-cloth gourd, has appeared in seedsmen's catalogues. An interesting novelty, particularly from a botanical standpoint, is a new species of corn (*Zea canina*) from Mexico.† It differs from common maize, among other things, in the production of several ears from one sheath or joint, and this feature suggests the amelioration of the species. I have grown the plant and find that a considerable portion of the ears can be made to mature in central New York.

Although not a horticultural product, the ginseng may be mentioned here. The cultivation of this medicinal plant in this country is likely to become important. Several valuable discussions of it have appeared in the press in the last two years, and the Ontario Agricultural College has issued a bulletin upon it. George Stanton, of Summit Station, New York, has undertaken its cultivation, and has issued instructions for its management.

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* Bull. xv. Cornell Exp. Sta.

† *Zea canina*, Watson, Proc. Amer. Acad. Arts and Sci. xxvi. 158 (1891).

§ 2. *Ornamentals.*

The increasing love of plants.

Probably no part of American horticulture is making such rapid progress as floriculture and other branches of ornamental gardening. This progress springs from both the positive energy of the florists themselves and from a rapidly growing demand for higher standards on the part of the public. There is probably no single factor in our national life which is more auspicious of refinement and love of home and country than this increasing expression of the æsthetic sense. The phenomenal increase in number of flower-shows, and in the appreciation of them by the general public, marks an epoch in our horticulture. Not only every large city, but hundreds of small cities and villages have held flower-exhibitions during the year, and almost without exception they have been successful. The shows of some of the smaller cities have been marvels of enterprise and skill. This era of great exhibitions must have a wider influence in molding and extending a simple love of flowers and of nature than any movement of previous times. It was but a few years since when flower-shows were financial losses in this country, but now they are eagerly patronized, even when good prices of admission are charged. A second indication of the growing love for plants and ornamental gardening is the increasing demand for practical advice concerning the embellishment of homesteads and city openings, and also the fact that a considerable number of professional landscape-gardeners now find constant and remunerative employment. The growth of the idea of the ornamented city park is a conspicuous tendency of the later years, and one which has exerted an influence too great for calculation. All these tendencies are matters of pride to every thoughtful citizen, for they show that the American is not deficient in that æsthetic taste which has been said, so often, to be foreign to him. The development of a new and great county has thus far absorbed attention, for it is only until the rougher elements of nature are overcome that the quieter joys of the garden appeal to the popular mind.

The grouping of plants.

Much professional study has been given to the best ways of growing plants for show-purposes and the methods of exhibiting them. Several departures are to be seen in the recent exhibitions, of which the most striking and most gratifying is the practice of grouping plants for their combined effects. This demands an artistic feeling on the part of the exhibitor, and it constitutes a distinct educational force as to the best use of ornamental plants. Not only are individual exhibits grouped or arranged in an artistic way, but the whole show is intended to present some harmonious and simple arrangement under the hand of a single designer. Plants, therefore, come to have a double use and meaning, a value as individual specimens and a greater value as a part of an artistic composition. And this accounts for the interest which the florists have taken during the year in the discussion of the æsthetics of color, under the leadership of F. Schuyler Mathews.* This artistic feature of flower-shows is prominent in England and elsewhere. The following editorial comment from an English journal is in point: † "The flower-shows of 1891 are now practically over, and looking upon them from an object-lesson point of view they clearly point in one direction. All the most satisfactory groups of plants, for instance, that call forth double skill, are those that have been arranged for effect. This shows an education acquired by some gardeners unknown to many in the past. The skilled competitor has not only to grow his plants well, but he has to group them together to have a pleasing effect; and not in the matter of color only, but of feature in respect to the blending of foliage as well as of flowers, and beyond and above all, the grouping. This is the most artistic work of modern gardening, and entitles the gardener who excels his neighbor in the double skill of growth and manner of arrangement, to a double-first, like the successful competitors in our universities of learning. The public, who really form the backbone of any society they patronize, are constrained to look at this—not with the sort of furtive glance which characterizes many of their movements in looking at so many plants, either distinguished for flower or foliage—and they go back

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*See discussions in *American Florist* for the year. †*Northern Gardener*, vi. 389.

again to see the attempt at the 'something new'; many of our decentralized shows even in our populous centers are going down simply because of the want of the 'something new.' The visitors in effect say: 'There is no cause of us going to such and such a show; there are the same plants from the same people year after year, and the thing is becoming far too monotonous.' Many people, again, who have no particular desire for seeing flower-shows, will not go simply because their friends, who are better informed than themselves, stay away because the advanced taste for novelty is not sufficiently catered for. Crowds flock round where the traffic is densest to satisfy their curiosity as to what others are looking at, and this has been the case in the respective shows which we have visited where the plants are arranged in groups for effect. To young gardeners particularly, and we might say even to old articled gardeners, these groups furnish object-lessons which, if properly looked into, will tell upon their practice many days hence. Of course the ordinary classes need not be sacrificed; but the principal prizes ought undoubtedly to go to the groups, and supposing these groups were offered in a series of three divisions, it would call up the various gardeners in small as well as in large places to try their hand to win the respective 'blue ribbands.'"

The flower show.

The carpet-bedding movement appears to have passed its zenith. At least, it is coming to be properly understood—to be considered not as an end, but simply as a small and comparatively unimportant part of a system which in the main follows freer and more natural methods.

People are coming more and more to love plants for their own sakes, and this desire finds gratification in the increasing number of native plants introduced to the garden, and in the new forms of old favorites. A reference to the census of American plants in a succeeding part of this volume will show the extent to which gardeners have drawn upon our native resources; and it is only necessary to consider the improved varieties of lilacs, hollyhocks, zinnias, portulacas, asters, poppies, marigolds, sweet-peas and many other species, to remind my reader to what extent the old-time flowers are finding places in modern gardens. Probably no exhibition of flowers could be so popular as one which should confine itself to the old-fashioned plants.

Old favorites.

The florists are certainly making the best of every circumstance to further their profession. They have been united and encouraged by means of the Society of American Florists, which, although in but its eighth year, is the strongest horticultural organization in America. A most auspicious influence of this society is the awakening of special and minor societies all over the country. The movement which a few years ago carried a horticultural or fruit-grower's society into so many of the local fruit-sections, is now eclipsed by one which has arrested the attention of florists in almost every important city in the land, and has established numbers of state and local organizations. Two special national societies of great promise have also been organized—the American Chrysanthemum Society, organized in 1889*, and the American Carnation Society, established this year.

S. A. F.

Carnations. The organization of the American Carnation Society is probably the most important independent floricultural movement of 1891. The society was organized October 15, at Horticultural Hall, Philadelphia, at which time about 50 names were placed upon the roll. The officers elected at this meeting are as follows: President, Edwin Lonsdale, Philadelphia; vice-president, William Swayne; treasurer, C. W. Ward, East Moriches, New York; secretary, C. J. Pennock, Kennett Square, Penn. These, in connection with Robert Craig, Philadelphia, R. T. Lombard, Wayland, Mass., and James Hancock, Grand Haven, Mich., constitute the executive committee. The objects of the society are stated by the constitution to be as follows:

Carnation Society

1. To increase the general interest in the cultivation and use of the carnation.
2. To improve the standard of excellence in the flower.
3. To improve the methods of cultivation and methods of placing it upon the market.
4. To increase its use as a decorative flower.
5. To improve the methods of growing plants and rooted cuttings, and marketing the same.
6. To infuse into the grower a more thorough understanding of the general rules of successful business management.
7. To supervise nomenclature properly.
8. To stimulate the growing and introduction of improved seedlings and crosses, by a system of exhibitions and awarding valuable prizes.

The annual meeting is to be held on the third Tuesday in

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*Organized as National Chrysanthemum Society. See ANNALS for 1889, 89.

February, at which time an exhibition of carnations will be held. The object of the exhibition is not so much to stimulate a competitive display as for the purpose of arriving at an intelligent opinion of the merits of varieties. It is proposed to create a "test committee," composed of growers in different parts of the country to whom new carnations can be sent, and the opinion of this committee will be expressed upon the novelties. It is the desire of the society to register all new carnations. Although only two and a half months have elapsed since its organization, 45 varieties have been registered, a fact which shows not only that the carnation industry is active, but that the growers are ready to support the society. The following is an official list of the 45 varieties registered in 1891, communicated by Secretary Pennock. Some of these varieties will not be on sale until 1893.

CARNATIONS REGISTERED IN 1891.

By John McGowan, Orange, N. J.—Iago, crimson; New Jersey, scarlet: Katharine Storrs, pink center, shading to white; Old Rose, salmon-pink; Purple Beauty, light purple; Pride of Essex, no color given.

By C. W. Ward, East Moriches, N. Y., Scarlet Ray, scarlet with white stripes; Zebra, no color given.

By E. J. Van Reyper, Belleville, N. J.—Florence Van Reyper, pure white.

By C. Eisele, Philadelphia, Pa.—Sambo, dark crimson.

By Messmore & Turner, Minerva, Ohio—Ida McKinley, pink.

By S. Lenton, Pine City, Cal.—Lavinia, scarlet; Buster, dark red; Piru, white; Adelaide, pink; Goldsmith, yellow and red; Marvel, dark pink and cream; Ideal, white and red; Romance, bright red; Jennie Parker, pink; Majesty, dark pink; Wide Awake, dark red; Evangeline, white and red; Paradise, bright red; Oona, dark pink; White Cap, white; Avalanche, dark pink.

By Edwin Lonsdale, Chestnut Hill, Philadelphia, Pa.—Grace Battles, delicate pink.

By Chambers Bros., Toughkenamon, Pa.—Grace Darling, pink; Waneta, white.

By Lothrop Wright, Framingham, Mass.—The Princess, pink; Helen Galvin, pink; Hesper, yellow.

By Lemuel Fawcett, Salem, Ohio—Mrs. Lemuel Fawcett, pink; Banner, silver-white striped with carmine; White Beauty, white.

By E. G. Hill & Co.—Edna Craig, soft pink; Sea Gull, white; Attraction, between scarlet and crimson; White Dove, white; Ben Hur, pink; Mrs. Hitt, deep pink; Indiana, creamy white and pink; Salmon Queen, soft salmon.

By C. J. Pennock, Kennett Square, Pa.—Pearl, white, with sometimes a rosy blush, blooms very large on erect stiff stems.

It will be profitable at this time to consider the present status of the carnation industry in America. The following discussion of the subject is contributed to this volume by Secretary C. J. Pennock:

"A casual observer, if at all interested in floriculture, cannot fail to have noticed that there has been a marked advance in the appearance of carnation-blooms as they are now offered for sale, as compared with the blooms as grown even ten years ago; and to those who have watched such improvement critically it is a prophecy of even greater advancement. Ten years ago the leading varieties were Edwardsii, Degraw, La Purité, King of the Crimsons, and Astoria, scarcely any of which are grown now by the commercial florist. Probably greater progress has been made during the last three years in the improvement of the carnation than ever before, and the present year has produced several varieties of striking merit.

"The demand continues to be greatest for white flowers, although shades of delicate pink command the highest market-price, with occasionally a rival in some showy variegated kind like Buttercup or Chester Pride—although, as a rule, flowers of a single color (self color), are most sought.

"The notable additions for the season of 1890–91 were Golden Gate, pure yellow; J. R. Freeman, crimson-maroon; Wm. F. Dreer, rose-pink; Angelus, pink; Daybreak, light pink; Edwin Lonsdale, pink; Dorothy, pink; Constancy and Fred Dorner, scarlets; Nellie Bly, Cæsar and American Flag, variegated with more or less scarlet and white; White Wings, Edelweiss and Lizzie McGowan, white.

"The flower-shows of the present year brought forward many seedlings, the pink colors being particularly noticeable. Many of these will not be offered for sale the coming year, but are held for the accumulation of stock. Of the seedlings to be had in 1891–'2 Aurora, pink, Grace Darling, pink, Thomas Cartledge, carmine-pink, Golden Triumph, yellow, Puritan and Pearl, whites, are notable; while of those not offered for sale the coming season, Grace Battles, Edna Craig, Pendleton, Ben Hur, Sea-Shell, all pinks, and several others designated only by numbers, will undoubtedly prove of value when they are to be had.

"The tendency at present seems to be towards a rapid increase of varieties, which at first glance may not appear desirable; but many of the older kinds are deficient on account of lack in size, form, fragrance, or stiffness of stem. The newer kinds, possessing more or less of these desirable qualities, may still not prove to be adapted to the treatment of different growers. This failure to prove universally good is apparent to a marked degree in some varieties of carnations, and as yet it appears to be little understood. The Buttercup is a striking example. At its best it is remarkably handsome, but many growers have been compelled to discard it entirely on account of failure to root the cuttings or to grow it in the summer preparatory to winter-blooming, and yet a few florists are now growing it as successfully as ever. The present tendency or aim of the specialist in this line is towards the production of larger flowers, on long stiff stems, with abundant fragrance. The petals need not be very numerous, but of a shape to fill up the entire area of the blooms, leaving no flat opening in the center. The petals of the ideal flower, when viewed from the side, will present in outline a semi-circular form, the lower ones extending horizontally, not drooping or incurved towards the stem. They will rise well up out of the calyx, which will be firm and large. The stem will be strong, to carry the flowers erect, and well supplied with foliage. This form is well illustrated in a flower introduced last season, Angelus, although it does not possess all the qualities of the ideal. More attention is being paid to fragrance than heretofore, and one seedling, Aurora, was given the preference in the award of a silver cup by the New York Florists' Club on that account.

"Mr. Thorpe's prediction of the ideal flower, so often referred to among growers—a flower 4 inches in diameter with the other highest attributes and to sell for $1 each—seemed somewhat chimerical when made two years ago, but now the fulfillment appears to be much nearer at hand. Flowers with particularly attractive qualities are selling readily for one-third to one-half advance over less favored varieties. The production of carnations is rapidly on the increase, while the demand seems to keep pace therewith. As in other industries, the supply of inferior products is often excessive, and the prices received fall below a profitable figure; but first-class flowers will readily sell at wholesale for 75 cts. to $1 for 100 blooms at any time, and during seasons of particular demand $2.50 to $3 per hundred is frequently obtained. It is safe to say that the production of carnation-blooms has increased 50 per cent. during the past year.

The Carnation industry.

"The most extensive carnation-establishments are in the vicinity of the large cities—Boston, New York, Philadelphia, Washington, Chicago, Cincinnati, Buffalo, etc., although from the fact that the blooms will bear long transportation they can be grown in localities quite distant from such centers. Southeastern Pennsylvania has been prominently known as a carnation section, and a radius of 50 miles from Philadelphia probably includes a greater number of growers than any other similar area. It is estimated that there are now about 1,500,000 square feet of glass devoted exclusively to the culture of carnations. At the ordinary space given to a plant, this would require about 3,750,000 plants. Thirty blooms is perhaps a moderate yield per plant, which at 75 cts per 100 would give 22½ cts. a plant or a total annual yield of nearly $850,000!

American Carnation Society.

"Observant growers have been aware for some time that causes unknown or little understood materially affect the growth of the plant and also the product. In some localities whole houses have succumbed to such attacks, while the amount of inferior flowers offered for sale, is sufficient evidence that there is much to be learned in this direction. Heretofore precautionary steps have been exceptional, spasmodic or non-systematic. The recently organized association, the American Carnation Society, will undoubtedly be able to investigate and throw light upon such points. This society is composed of growers and those interested in carnations, united for the exchange of thought and the improvement of methods relative to the cultivation of carnations. Exhibitions of new and valuable seedlings will be held, and at the meetings papers on practical themes will be presented and discussed."

An interesting result of the carnation agitation of the year has been the coining of the word "carnationist," to designate a fancier of these plants.

Chrysanthemums.—Interest in chrysanthemums continues to increase. The chrysanthemum is undoubtedly the most popular flower at the present time for display and exhibition purposes. None other lends itself to so many varied uses at the expenditure of so little labor, and none other presents so many diverse and becoming forms, habits and colors. It is particularly well adapted to exhibition purposes, and it now composes the body or the finish of every late autumn show. A full account of the American varieties of the year will be found in "Introductions of 1891," in Part II. of this volume. The following account of recent American chrysanthemums is written for this occasion by Edwin Lonsdale, of Philadelphia, Secretary of the American Chrysanthemum Society:

Chrysanthemums.

"While cultivation for fine blooms of chrysanthemums has been increasing, that of specimen plants has not improved of late, if, in fact, it has not actually decreased. At the Madison Square Garden Exhibition, held under the auspices of the New York Florists' Club, in November last, the plants were not nearly so good as we are accustomed to see at Philadelphia. It is acknowledged by those who have had an opportunity of seeing the different shows, that the city of Brotherly Love leads them all in respect of fine specimen plants. One exhibitor, James Vernor, gardener to A. J. Drexel, has taken the one-hundred-dollar premium for twelve plants for the last three years, and although his plants were almost, if not quite, as good at the show of 1891 as they were in 1890 and 1889, yet the competition was not nearly so keen. When one considers the watchful care that is required to have plants in a creditable condition on the day of the show, we need not wonder that the competition is dropping off.

Specimen blooms.

"The production of large specimen blooms is on the increase, both in quantity and quality. While care is necessary, of course, to grow first-class blooms, either for exhibition or for sale, yet it requires much less skill to produce superior blooms for cutting than it does to grow even a passable exhibition plant. The comparative ease with which these high-class flowers are grown, makes the judicious florist solicitous for the future. The effect of over-production will be felt first in New York, Boston, Philadelphia, Chicago, and the other large cities.

"The demand for large flowers—those that have been grown on plants that have been disbudded to a single bud on stout, erect stems—still continues. The artistic mind deplores the fact, preferring sprays disbudded to not less than three buds. Flower-buyers generally have not reached that point, and prefer the more massive blossoms, presumably because there is more evidence of skill in the production of the larger blooms than the more artistic sprays. We hope that the time is not far distant when mere size will not determine the value of a flower.

Plant trade.

"The pot-plant trade has always been good in Philadelphia. This is accounted for, to some extent, by the fact that many of the more prominent growers are conveniently situated to deliver plants to the stores at short notice. The variety Ivory has been popular as a pot-plant for the last two seasons. It is shapely as a plant, a clean and healthy grower, and comparatively dwarf ; a good flower, incurved Japanese, and a beautiful white. This variety is also a good one to grow for cut-flowers. Some of the vases of this sort, as seen at New York, were among the very best. It is one of the best all-round varieties we have.

New Chrysanthemums.

"Among the new chrysanthemums which were exhibited for the first time in the autumn of 1891, the Yellow Ostrich-Plume has attracted much attention. It is believed to be an importation from Japan. Pitcher & Manda have one which has been named W. A. Manda. Peter Henderson & Co. also have one which they call P. Barry. If these should prove to be identical, and good judges say that they are, the name W. A. Manda should take precedence, as it was the first name received for registration by the Secretary of the American Chrysanthemum Society. Another novelty was exhibited by Pitcher & Manda, which belongs to the same class, and it is believed to have some points of superiority over Mrs. Alpheus Hardy. It has been named Annie Manda. It resembles Mrs. Hardy in hairiness and color, but it is distinct in form, and the stem is much stouter. Golden Wedding, exhibited by Peter Henderson & Co., is a distinct and beautiful variety. It will be good for either exhibition or commercial cut-blooms. Good Gracious is similar in form to Kioto, but it is a delicate pink in color. Philadelphia looked very much like Peter B. Mead, with its thread-like tubular florets curling and twisting similar to excelsior packing. O. P. Bassett, exhibited by E. G. Hill & Co., is likely to prove useful, being similar to Cullingfordi in color. Maude Dean is a pretty pink, quite large, and Mrs. Robert Craig is good in shape and exquisite in color—a beautiful white. Emily Ladenburg, exhibited by Thomas H. Spaulding, received a silver cup at New York. It is a rich crimson. Roselyn is a large pink. Colonel William B. Smith is bronzy yellow, large, distinct in form. Dr. Jesse P. Duryea is a delicate pink, and promising. It has a reflexed flower and is full to the center. Mrs. John Gardiner is canary-yellow, and resembles the Chinese sorts in form. Harry May attracted much attention. It has received honors at all the exhibitions where it has appeared. It took the Lanier cup at New York, a silver medal at Philadelphia, and a certificate of merit at Indianapolis. The Mrs. Louis Childs Madeira may be described as a golden ball—indeed, that is its pet name. It is one of the most distinct varieties which has been brought been brought before the public for a number of years.

New Chrysanthemums.

"It is a noticeable fact that the novelties which attracted the most attention this year were generally those which had been carried over the second year. It is very tempting to exhibit the flower of a seedling which shows merit, if it is distinct in character, form or color, or exceptionally large in size, but it is not always policy to do so. Something will have to be done soon to stem the torrent of new varieties which is annually increasing in volume. One way would be for the Society not to recognize by cup, medal or certificate, any variety, no matter how good it may be, unless at least six blooms are exhibited, and it would be better to make it twelve.

Raising Seedlings.

"The raising of seedlings is assuming alarming proportions. The conservative mind shrinks from what is to come, while the philosopher declares that it is one of those evils which will correct itself. The number of novelties offered each year is bewildering, so much so that the would-be purchaser hesitates to buy until he is satisfied that he is getting the best; and this fact should be determined by the public recognition of only those which are thoroughly deserving. Horticultural societies have it in their power to protect the public, and they should not hesitate to exercise that function. Some idea of the extent to which the raising of seedling chrysanthemums may be carried can be gathered from a letter which I have received from my friend Mr. Haettel, of California, dated October 28, 1891: 'Regarding chrysanthemums, I have about 2,500 seedlings in bloom and coming into bloom. I will send you some of my best varieties. I always grow them the natural way, without disbudding. This is the best way to test the true value of a variety. I keep the best for seed and destroy the balance. I have obtained some beautiful varieties in the past two years. They seed very freely outdoors here, but not in the greenhouse. It may be that the air is too damp without fire heat. This applies also to carnation-seedlings.' When we realize that an acre of chrysanthemums can be raised and cared for with very little more expense than we can raise an acre of corn, it is no wonder that the conservatives are nervous. Radical changes will be necessary in a very short time to control the chrysanthemum-novelty fever.

Exhibition plants.

"The exhibitions which were held in the smaller towns last autumn would have done credit to any of the large cities six or eight years ago. The best varieties for exhibition purposes, grown as pot-plants, seem to be the following: Robert Bottomley, similar to Moonlight, but superior to that good old sort; Lilian B. Bird, delicate pink in color, tubular florets: Cullingfordi, rich crimson, hardly surpassed to-day in its line of color; President Harrison, darker in color than the preceding, not so bright, broad florets and large flowers; Mrs. Irving Clark, pink, very large; Kioto, bright yellow in color, beautiful in shape, but the stems are rather too weak to make it an ideal exhibition variety; Mr. H. Cannell, in same line of color and form as the last, may be better suited to the purpose indicated, as it has stouter and more erect stems; Gold, also known as Mrs. Richard Elliott, is a very healthy grower, inclined to be late, and the flowers are about medium in size; Frank Wilcox, bronzy yellow, is rather a small flower, yet on account of its sturdy habit of growth and bright color it lights up a collection of plants better than almost any other kind; Puritan generally comes a delicate pink in color, though it is occasionally pure white, Neesima, one of the lot which came over with the Mrs. Alpheus Hardy, is still one of the best and most beautiful yellows we have, there being something very distinct in its coloring, yet hard to describe; W. H. Lincoln is another good yellow that cannot be too highly recommended, either as an exhibition pot-plant or for cut-flowers; Mrs. A. Blanc is a good pink, and a robust, healthy grower; Louis Boehmer, the pink ostrich-plume, makes a good pot-plant, though the color is against it; William Falconer, the delicate pink sport from the last-named, will doubtless supersede its sportive parent on account of its more pleasing shade of color; Mrs. William Bowen, an improved Mrs. Charles Wheeler, is sometimes seen in excellent condition, though it is uncertain; La Triomphante is an old variety rarely seen now-a-days. One exhibitor at Germantown stated that he had grown this last continuously for the past fifteen years, but now he never sees it offered for sale through catalogues. It is white, shaded delicate pink. It is a beautiful sort, and well worth preserving."

The following careful review of the Continental chrysanthemums, introduced into the 1891 trade, is made by a correspondent of *The Garden*:*

Continental chrysanthemums.

"When the list of new Continental chrysanthemums for 1890 was given in *The Garden* about twelve months since, it will be remembered that the number distributed then was fewer than had been the case for some years previous. No such cause for congratulation, however, can now be found; for upon casting up the varieties mentioned in the foreign catalogues as new seedlings for the ensuing year, the total appears to be 284 of all sections. In this number are included the productions of all the eminent raisers, such as Délaux, De Reydellet, Lacroix, Rozain, as well as those of several new-comers in the field, whose names are not so familiar to English cultivators, although no doubt their flowers will ultimately find a place, even if only a temporary one, in the collections of the English importers and trade-growers.

"Some of those raisers mentioned last year as not contributing to the list then, are in their place again this time, Macary and Lassali in particular; but Dr. Audiguier, Baco, and Pertuzès seem to have stayed their hands for another season, with what result it would be imprudent to predict. The 1891 novelties, of course, comprise varieties of all established sections, but a new race is promised, being the result of carefully hybridizing the Malgako; and with four new flowers as the nucleus of what is to be termed the 'Toulouse race,' we may expect further complications of classification which will, like the Japanese iucurved, Japanese anemone, Japanese reflexed, be duly treated by the properly constituted

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*"Chrysanth," in *The Garden*, xxxix. 407 (May 2, 1891).

authorities. There is not a little speculation as to the form of these promised new-comers, for chrysanthemum Malgako is entirely unknown to this country, and whatever peculiarity of form or habit it may have, can only be determined after we have been duly placed in possession of that variety or its new issue.

New type of Chrysanthemum.

"Another point concerning the novelties for the year is the announcement that a considerable number belong to the large-flowered, early-blooming section. Of these, Délaux alone takes credit for distributing 125 varieties, some of which are recommended as beginning to flower so early in the year as the month of June. For purposes of reference, it has been deemed advisable to separate such from the ordinary autumn-blooming varieties, and give an independent list of each.

"For the first time in our experience it may be noticed that a Belgian nurseryman is acting as an original distributor of new seedlings. M. Chantrier, whose name is closely connected with chrysanthemum-culture in France, from an exhibition standpoint, has taken up with seedling-growing, and has disposod of his gains to M. Rosseel, of Ghent.

"In the annexed list every effort has been made to ensure brevity consistent with accuracy. It is not always easy to cut down a foreign description to just sufficient for English readers. An instance may be cited to show to what lengths a translator may go. One of the new chrysanthemums has this year thirteen closely printed lines devoted to its description, containing over 100 words of more or less eloquent language, while perhaps ten words at most can be afforded here. The classification in each case is that given by the raiser, and although it is the best that can be given at present, it will, as previously stated, be unsafe for English growers to rely upon what, even in France, is as yet a vexed and unsettled question. New chrysanthemums can only be properly classed when grown by English cultivators and submitted to some authority, like the Floral Committees of the Royal Horticultural or National Chrysanthemum Societies, and until the flowers now mentioned have been bloomed in this country, all attempts to do so, or reliance upon others, is likely to lead to much confusion and disturbance of established principles. Thus it is that for merely reference purposes we give the section as indicated by the raisers, or omit it altogether if they do.

The list.

"As an indication of the keenness of our Continental brethren in this branch of horticulture, it may be mentioned that a great improvement is gradually taking place in the style of printing, illustrating and editing their catalogues ; especially has this been noticeable during the past two or three seasons. The American seedlings, and importations into that country from Japan, have made quite a stir amongst the French, with the obvious result that all the leading specialists have procured the cream of the American varieties to add to their collections. It is earnestly to be hoped that this influx of new blood will, by dint of careful and intelligent hybridization, be the means of raising the standard of the Continental chrysanthemums, than which, perhaps, in the past none ever held a higher place on the show-boards of this country.

Continental Chrysanthemums.

"*Alexander Vogel* (Delaux). Pompon ; white, shaded rose.

Alfred de Musset (Lacroix). Japanese ; soft rose, passing to white, striped violet.

Ami Jules Chretien (Hoste). Japanese ; bright poppy-red, shaded chestnut.

Archimede (Lacroix). Japanese ; color burnt sienna, shaded golden yellow, reverse yellow.

Auguste Nonin (Lacroix). Japanese ; burnt sienna, striped yellow, reverse lighter.

Baron Lombard de Buffieres. Japanese ; rose and white.

Beau Rêve (Delaux). Japanese single ; silvery-white, shaded rose.

Beauté Toulousaine (Lacroix). Japanese semi-double ; dark purple-red, reverse golden.

Bolide (Lacroix). Japanese ; light rose, striped white, tips golden.

Cardinal Foulon (Rozain). Japanese ; rosy purple.

Carl Kaiser (Delaux). Japanese ; crimson-red, shaded velvet-brown, yellow tips, reverse silvery claret.

Clothilde Gange (Delaux). Japanese Anemone ; silvery rose, golden center.

Commandant Maraignon (Macary). Japanese ; carmine-violet.

Comte de Galbert. Japanese ; coppery golden color.

Comte F. Lurani (Delaux). Japanese ; rose and white.

Comtesse d'Archiac (Chantrier). White.

Emelia (Rozain). Japanese ; light red, mingled dark yellow.

Em. Goffin (Delaux). Japanese ; brown-red, striped gold, canary center, edged red, reverse gold.

Etoile de la Pape. See Mme. Bié.

Felix Cassagneau (Delaux). Japanese ; bright orange-yellow, striped reddish salmon.

Felix Mourat (Delaux). Incurved ; dark yellow and dark crimson.

Ferdinande Ponci (Delaux). Japanese incurved ; crimson-red, shaded velvet.crimson, golden reverse.

F. Massange de Louvres (Delaux). Japanese ; canary-yellow, striped carmine.

Gaetano Guelfi (Delaux). Japanese ; white.

Gay Lussac (Lacroix). Japanese ; violet-rose, striped white.

Général Comte Pajol (Chantrier). Incurved ; dark coppery yellow, golden center.

Great Eastern (Lacroix). Japanese ; brick-red, striped golden yellow, tips golden.

Henry Barrere (Lassali). Anemone ; yellow, reverse striped blood-red.

Incandescent (Lacroix). Japanese ; coppery red, lightened flame color.

Il Trovatore. Japanese semi-double ; soft rose, white reverse.

Jaguarita (Lacroix). Japanese single ; soft rose, edged violet.

Jean Macary (Macary). Incurved ; velvety dark crimson, lightened bright flame color.

Jeanne Lassali (Lassali). Anemone ; rose, center white.

Jules Roland (Delaux). Pompon ; silvery white, shaded rose.

La Condamine (Lacroix). Japanese ; creamy white, striped rose.

La Mascotte (Lacroix). Japanese single ; creamy white, lightened yellow.

L'Amphitrite (Lacroix.) Japanese ; white, edged violet.

La Neige (Lacroix). Japanese single ; white.

La Rosiere (Rozain). Japanese Anemone ; bright violet, rosy ray florets, silvery rose disc.

European Chrysanthemums.

L'Avenir (Delaux). Japanese single ; golden yellow, shaded crimson.

La Vive (Chantrier). Japanese ; brick-red, orange center.

Le Cid (Lacroix). Japanese single ; dark red, golden reverse.

Le Cygne (Lacroix). Japanese anemone ; white disc, white, shaded yellow.

Le Nouvelliste Bordelais (Chantrier). Japanese ; dark lilac.

Le Verseau (Lacroix). Japanese ; rose, striped white, center claret.

Libellule (Lacroix). Japanese semi-double ; soft rose, lightened white.

Louis Voraz (Rozain). Japanese ; sulphur-white, shaded violet.

Mme. Bié (Rozain). Japanese (syn., Etoile de la Pape) ; creamy white, passing to pure white.

Mme. Ceuzin-Jacob (Hoste). Japanese ; orange, tipped salmon.

Mme. de Montigny. Reflexed ; rosy lilac, tips buff.

Mme. de Waresquiel. Chinese ; white, mottled lilac.

Mme. Elizabeth Labat (Delaux). Japanese ; white.

Mme. Forgeot (De Reydellet). Japanese ; white, tinted mauve, center light rose, tinted pale yellow.

Mme. Giraud de Montfalcon (Rozain). Japanese ; pure violet, tipped yellow.

Mme. Itasse (Lacroix). Japanese ; fine porcelain-white, edged light violet.

Mme. la Marquise de Panat (Lacroix). Japanese ; pure white.

Mme. L. Vouga. Incurved ; rose, tipped salmon.

Mme. Roman (Hoste). Incurved ; milk-white.

Mme. Vallet (Lacroix). Japanese ; light rose, lightened white.

Mlle. Berthe Chantrier (Chantrier). Cream, reverse rosy white.

Mlle. Camille Drevet (Chantrier). Pompon, white.

Mlle. C. Borthere (Chantrier). Gooseberry-red, tinted orange.

Mlle. Holaind (De Reydellet). Japanese ; light canary-yellow, passing to white.

Mlle. Igounenc (Lassali). Anemone ; white, shaded carmine-rose ; center same color, tipped gold.

Mlle. Marie Lagrace (Chantrier). Chinese ; white.

Mlle. Marthe Bocher (Chantrier). Japanese ; velvet-red, tipped yellow.

Mlle. Nathalie Brun (Lassali). Anemone ; white, center golden.

Mlle. Paule Labat (Lassali). Anemone ; white and rose, disc yellow.

Marcel Grilli (Delaux). Japanese incurved ; ochre-yellow, striped crimson, reverse gold.

Marguerite Perrot (De Reydellet). Japanese incurved ; pure white, light yellow center.

Maria Laglaize (Lassali). Anemone ; white, center yellow, passing to white.

Marie Crepey (Delaux). Japanese ; violet silvery white, edged violet-rose.

☐ *Marquis de Paris* (Delaux). Japanese ; sulphur-white, darker center.

Mars (Lacroix). Japanese ; bright golden yellow, reverse striped chestnut.

Maxime de la Rocheterie. Incurved ; bright carmine-lake.

M. Albert Lemaille (De Reydellet). Japanese ; Indian lake-red, yellow tips, dark yellow center, rather late.

M. Alphonse Seux (De Reydellet). Incurved ; rosy lake, silvery reverse.

European Chrysanthemums.

M. A. L. Rosseel (De Reydellet). Japanese ; blood-red, reverse old gold, gold center.

M. Ant. Raymond (Hoste). Japanese ; orange-yellow, pure yellow tips.

M. Auguste Nonin (De Reydellet). Japanese ; white and light mauve.

M. Boutreux (De Reydellet). Japanese ; dark poppy-red, reverse and center bronze, rather late.

M. Bredemeier (Delaux). Incurved ; amaranth-violet, reverse silver.

M. de Longhi (Delaux). Incurved ; golden yellow, striped crimson-red.

M. Dupanloup (Lacroix). Japanese anemone ; violet-rose, darker at tips, disc same color, golden tips.

M. Dupanloup (De Reydellet). Japanese ; purple, light center, dark tips, spotted white.

M. Emile Lemoine (Hoste). Purple-violet, reverse and tips white.

M. Etienne Salomon (Hoste). Japanese ; chrome-yellow, white reverse.

M. Eugène Delaire. Japanese ; velvety carmine, tips silvery.

M. E. Vaucher (Hoste). Japanese ; light satiny lilac, tips dark amaranth-violet.

M. Eymard (Rozain). Japanese ; rosy white, passing to pure white.

M. Focquereau l'Enfant (Hoste). Incurved ; flesh white, reverse rose.

M. F. R. Pittet (Hoste). Japanese , bright red, shaded salmon.

M. Henri Correvon (De Reydellet). Japanese anemone, light buff ray florets, center golden yellow.

M. Henri Courtaing (Macary). Japanese incurved ; dark brick-red, lightened buff, reverse gold.

M. Henri Vanderlinden. Incurved ; silvery white, shaded carmine-rose.

M. Heraud (Rozain). Japanese ; silvery rose.

M. H. Fouquer (Hoste). Japanese ; mauve-rose, carmine center.

M. Hillebrand (Delaux). Japanese ; crimson-red, golden center, reverse yellow.

M. H. Maubec (Hoste). Incurved ; rose with white reverse.

M. John Wolf. Incurved ; purplish-rose and white.

M. Josseaux (Delaux). Japanese ; carmine-rose, striped white, white center, golden reverse.

M. Jules Castagnet (Chantrier). Pompon ; old gold.

M. Louis Larcy (De Reydellet). Japanese ; carmine, lighter towards the tips.

M. Max. de la Rocheterie (De Reydellet). Japanese ; dark purple-lake, yellow-bronze tips and center, rather late.

M. Mézard (Lacroix). Japanese ; dark brick-red, reverse old gold.

M. Mulnard (De Reydellet). Japanese ; rose, passing to creamy yellow in center.

M. Nuz (Delaux). Japanese ; dark crimson-red, reverse old gold.

M. Vachoux-Marchand (Hoste). Japanese ; flesh-white, reverse violet.

M. Vitron (Delaux). Japanese single ; violet-rose, shaded white.

Mrs. Georges Daniels (Rozain). Japanese ; fine rose, hairy petals.

Murillo (Lacroix). Japanese semi-double ; dark purple, reverse dark gold.

Nain Original (Delaux). Single ; canary-yellow and white.

Papa G. Sautel. Japanese ; velvet-carmine, center darker, reverse and tips silvery.

European chrysanthemums.

Paille des Pyrénées (Chantrier). Japanese ; straw-yellow.

Papillon (Lacroix). Anemone ; light chrome.

Ph. Rivoire (Rozain). Japanese ; straw-yellow, passing to creamy white.

Pic Neigeux (Chantrier). Pompon ; dark violet and white.

Président de Formigny de la Londe. Incurved ; coppery gold, center buff.

Président Louis Lyand. Reflexed ; dark amber-yellow.

Prof. Henri Welter (De Reydellet). Japanese incurved ; dark carmine, reverse paler.

Reyer (Lacroix). Japanese semi-double ; fine amaranth-violet, shaded flame color.

Rodolpho Ragionieri (Delaux). Japanese anemone ; silvery white, shaded rose, golden center.

Rosée Matinale (Lacroix). Japanese semi-double ; soft rose, white reverse.

Salvayre (Lacroix). Japanese single ; amaranth-violet, lightened flame colour, ashy reverse.

Secretaire A. Colmiche. Japanese ; light canary-yellow, striped rose.

Secretaire A. L. Rosseel (A. Cendron). Japanese ; white and cream, shaded violet.

Source du Japon (Chantrier). Old gold, speckled brick-red.

Souvenir de Mme. David Coren. Incurved ; snow-white.

Trivier (Rozain). Japanese ; creamy white, tips and center sulphur-yellow.

Uranus (Lacroix). Japanese ; pure white.

Ville de Bayonne (Chantrier). Soft lilac.

Virgile (Lacroix). Japanese ; white, shaded sulphur-yellow, center light yellow.

Violacea superba (Lacroix). Japanese single; color rather lighter than *Erecta superba.*

Visconti Felix (Delaux). Japanese; crimson-claret and white, striped violet-rose.

W. F. Dixon (Delaux). Japanese; crimson-red, flamed yellow, yellow tips, reverse golden."

Roses

Among *roses,* nothing of unusual interest has occurred during the year, except the introduction of the Waban. This rose originated at the Waban conservatories of E. M. Wood & Co., Natick, Mass., and was introduced to the trade by the originators in the spring of 1891. The rose has been before the public for nearly two years, however, and its merits are well understood.* The Waban is a sport of Catherine Mermet, and differs from it only in color, which is two shades deeper, being a bright, rich pink. It has had the silver medals of the Massachusetts and Pennsylvania Horticultural Societies. E. G. Hill, the well-known rose-grower of Richmond, Ind., writes that the rose novelties of the year, with which he is experimenting, are all comprised in the lists spread in Annals for 1890.† These foreign roses arrived so late last fall (1890), that satisfactory tests of them have not been completed.

The following English experience of some of the newer roses will be valuable to American growers:‡

English roses.

"One sometimes sees a good rose at an exhibition, and when purchasing a plant finds it to be a very weak grower and altogether an indifferent doer. This is very disappointing. There are some roses of recent introduction that are worthy of taking rank among our best, and I propose naming a few of them, and giving as fair a description of the same as I can. Germaine Caillot and similar bad growers I will not mention; and readers may therefore conclude that all in this list are well worth purchasing whenever they can find room for a few more plants.

"Souvenir de S. A. Prince, one of the finest white roses ever introduced, very free-growing and flowering, and also one of our sweetest-scented roses. This variety is synonymous with The Queen, and originated in the same manner.

"Madame Hoste is a pale yellow of really first-class quality, somewhat like a very pale specimen of Anna Olivier, but generally speaking it is quite distinct; a very free-flowering kind, and a good one for a wet and dripping season.

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*See American Florist for January 22, 1891, for a colored portrait of the Waban. See also Annals for 1890, 43.

†Pp. 41-56. ‡A. P. in *The Northern Gardener,* I. new series, 4 (Jan. 1, 1892).

"Sappho has a splendid blending of fawn, deep buff, yellow and rose shades; it is also wonderfully sweet-scented.

"Cleopatra is of fine form and substance, and has very long and pointed buds of a sweet and delicate pale pink, edged with bright rose; this is one of the best roses of 1889.

"Ernest Metz is a grand acquisition, very double, and borne upon strong stalks, which carry the flowers in a particularly bold and striking manner; the flowers are very double and distinct, being a tender carnation-rose, with a brighter center and also deeper on the reverse side of its petals. It is a splendid habited kind, and one of the very best.

"Kaiserin Freiderich is the result of a cross between Perle des Jardins and Gloire de Dijon, two of the best roses grown, and it is well worthy of its parents. I am more taken with this rose and the two following varieties than with any other of the climbing Teas sent out for many years. This kind flowers freely, and grows equally as strong as the old and valuable Gloire de Dijon. Its color is a happy blend between its two parents, turning pink towards the outside of the petals when fully exposed to the sun.

European roses.

"Henriette de Beauveau is the best pure yellow rose sent out for a long time. It is a splendid climber, a free and constant bloomer, and altogether one of the finest acquisitions among roses during the last ten years or more.

"Kronprinzessin Victoria, or Crown Princess Victoria, which is a sport from Souvenir de la Malmaison, is the finest addition to the Bourbon section for many years. It may be described as a particularly free-flowering Souvenir de la Malmaison, of whiter color generally, and with a very soft and pretty shade of cream in the center, with a blush tint on the edges of the petals. This is the best Bourbon rose grown.

"Duchesse d'Auerstadt is a very vigorous grower, pure yellow when in the bud, changing to pale nankeen as it expands.

"Madame Moreau is another good climbing rose of a rich coppery yellow, blended with apricot; the edges of the flower are tinted with rose. [See ANNALS for 1890, 54.]

"White Perle, a pure white sport from that grand rose, Perle des Jardins, and retaining all its qualities, need have no more said in its favor to recommend it to any who is acquainted with Perle des Jardins.

"Waban is a deep-colored sport from Catherine Mermet, and when we remember how The Bride has taken with the public, and that it originated from the same source, I am sure it will be tried by a good many, independently of my recommendation. I have grown it, and it is a very promising rose. It originated at the Waban Conservatories in Massachusetts, U. S. A. I will give the raiser's description, and can endorse the greater part of it: 'In foliage and vigor, Waban resembles its parent; flowers borne on long, strong stems, in form somewhat larger and exceeding in size and number of petals. [I do not endorse the last sentence; it is as large as C. Mermet, and as full, but not more so.] Color carmine-pink, splashed with flaming madder-red, shaded brilliantly upon outside petals, and as you approach the center of the bud, each petal increases in intensity and color. Reflexed petals are more delicate in color, but shaded stronger at the end. From our knowledge and experience in the growing of roses, we do not hesitate to say that this rose is one of the greatest acquisitions to the Tea rose family, and it is the finest which has come to our knowledge.' There! if you discount that description ever so slightly, you have a fair estimation of this grand rose. [See page 74; also § 1, Part ii.]

The newer roses.

"Climbing Niphetos must rank as our very best white climber under glass. It is always good, and remarkably free-blooming, and a wonderfully vigorous grower. You should leave the long Marechal Niel-like shoots intact, and will then be rewarded with flowers quite equal to the old Niphetos, and from every eye upon these long growths. It is simply a grand rose. [See Annals for 1890, 56.]

"L'Ideale is a Noisette of first-class merit, bright, rich golden yellow in color, splashed with orange-yellow and metallic red; a very distinct and attractive rose.

"The foregoing are the very best of the Tea-scented and Noisettes, and all are worth obtaining.

"Hybrid perpetuals. Margaret Dickson is indeed a grand acquisition, and so I place it first on my list. It is very new, only being put in commerce this year (1891). It gained the gold medal last year, and first prize for any new rose, and also for twelve white roses this season at the Crystal Palace show. The foliage is very fine, so is its habit of growth, and it is said to be certain to oust that grand rose, Merville de Lyon, out of the field. This is high praise, but I believe it really is an improvement on M. de Lyon. Color white, with pale flesh center, very large petals and of best substance.

"Marchioness of Dufferin is sent out this year by the same Irish firm as the foregoing, and is also a grand rose of enormous size, beautiful rosy pink in color, with a suspicion of yellow at the base of the petals. This variety gained the gold medal at the Hereford exhibition of the National Rose Society, in 1890.

"Gustave Piganeau. The more I see of this rose the better I like it; it is one of the finest for decorative purposes on a large scale. It gained the award of a silver medal at the Crystal Palace show this summer as being the finest hybrid perpetual in the show exhibited by a nurseryman. A very strong grower, very large, and of good form and substance. [See ANNALS for 1890, 43.]

The newer roses.

"Margaret Haywood is a sport from Madame Clemence Joigneaux, and is certainly possessed of the fine and vigorous constitution of that variety; it is said to be a good flower, but I have not seen one quite up to the description yet. Color bright rosy pink; full and very globular. Like Madame C. Joigneaux, it seems to be mildew-proof.

"La France of '89 is a puzzling name, but it is undoubtedly a grand rose. It is a good grower, very brilliant red in color, large, free-flowering, and with long buds of pointed shape. This rose seems to present a great deal of the China form, and is very free in growth and flowering.

"Augustine Guinoisseau is a grand rose that may be very correctly described as between Mrs. Bosanquet and Viscountess Folkestone. It is a wonderfully free bloomer, and a splendid pot rose. [See ANNALS for 1890, 43.]

"Madame Renahy, a large and globular flower, light carmine-rose in color, shaded with lilac. A good grower and particularly sweet-scented. Sure to prove a great favorite with all who try it. [See ANNALS for 1890, 43.]

"Souvenir de Monsieur Gomot is a little after the deep-colored Sir Roland Hill, and is a first-rate rose, of good growth and habit.

"There are other good roses which might be named in this list, but as they are not quite so new, and are consequently better known, I refrain from taking up space with their description. I will, however, give their names: Mrs. John Laing, Earl of Dufferin, Lady Arthur Hill, Madame Henri Periere, Sir Roland Hill, Duchess of Leeds, Caroline d'Arden, Maid of the Mist, Monsieur Trievoz, Silver Queen, Ethel Brownlow, Luciole, Madame Pierre Guillot, Mrs. James Wilson, and Grace Darling."

Orchids

Among *orchids* there has been the usual activity, but despite the efforts of orchid-growers these plants have not attracted the popular mind in this country, and it can hardly be expected that any of them can ever attain to any such degree of popularity as attaches to the chrysanthemum and carnation. Among orchid-fanciers themselves, however, there exists the most exuberant enthusiasm, and every departure in form or color of flower, no matter how slight, at once attracts general attention.

Cattleya labiata.

Perhaps the most important discussion of the year is that relating to the reintroduction of *Cattleya labiata.* This valuble Brazilian orchid first appeared in England nearly seventy-five years ago. It appears to have been discovered nearly simultaneously by William Swainson and M. Linden. The plant has always been much sought by orchid-fanciers, and prices have been high. "Few orchids," writes Lewis Castle,* "have so interesting a history as the original *Cattleya labiata*, but it is extremely probable that we shall never hear the whole of the facts connected with it, for many of the links in the chain of evidence have been lost, and others can only be supplied by those who are not likely to do so at present. It is certain, however, that for many years every effort made to discover the native habitat of this cattleya has failed completely; collectors were repeatedly despatched by the leading firms, and thousands of miles have been explored without the slightest success. It would be impossSible to calculate how much has been expended upon these fruitless searches, and it had gradually become a fixed idea that the original *Cattleya labiata* was really extinct."

A brief history of this interesting cattleya is contributed by F. Sander to the *Journal of Horticulture*:† "It was discovered in 1817 by Mr. William Swainson in the Brazils. He sent plants to London, and one flowered in 1818, with Mr. Cattley, of Barnet, after whom Lindley named the genus. The elder Hooker also had a piece from Mr. Cattley, and with him it flowered in 1821. There were, I should think, some two or three dozen plants sent at first. Mrs. Horsfall, of Liverpool, received some from the captains of vessels trading with the Brazils, about 1830, and about 1845 a small lot arrived in France. There the matter rested until about 1882, when a small consignment came to the London Zoölogical Gardens, and passed into the hands of Mr. B. S. Williams, of Holloway. Again, two years, a small consignment arrived in France." The recent introductions of this cattleya occurred in 1890 and 1891. The plant introduced in 1890 was not recognized as true *C. labiata* at first, and was named *C. Warocqueana*. Some growers pronounced it a variety of *C. labiata*, and others placed it with *C. Gaskelliana*. Both these views are on record in ANNALS for 1890, on pages 57 and 59, respectively. While most growers consider *C. Warocqueana* and *C. labiata* to be identical, there are others who still regard them as distinct, and among these is so good authority as Lewis Castle, who writes :* "Further evidence may be forthcoming that cannot be ignored, but up to the present time I have not seen a *Cattleya Warocqueana* which I could consider identical with the old *C. labiata vera*, with which I have long been familiar in English collections."

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*Jour. Hort. Sept. 24, 1891, 262. †Ibid.

History of Cattleya labiata.

There has been much discussion in Europe as to the botanical position of *C. Warocqueana*, and, unfortunately, the debate has not been free from personalities. The following extracts from a letter published by L. Linden, as a supplement to *Le Journal des Orchidees* (October, 1891), appear to represent the salient facts in the record of the reintroduction of *Cattleya labiata* : "My father, to whom botanists and horticulturists owe the discovery and original introduction into Europe of almost all the beautiful cattleyas known, was long aware of the fact that a certain district in Brazil contained a remarkable species of cattleya in abundance. In the month of December, 1889, we sent our collector, Mr. Bungeroth, to this region, in order that he might send us several thousand specimens of the plant.

Reintroduction of the cattleya.

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*Jour. Hort. Oct. 1, 1891, 283.

The first introduction arrived in good condition during the month of April, 1890. In one of the cases of this shipment, about a dozen plants were in blossom, and the flowers were naturally very much torn and injured by the voyage. But all the rest bore flower-stalks which were entirely dried, and, as can readily be seen, it was impossible to tell if the flowers had been borne four or five months or a year before. Those which were received in flower were placed together in one of our houses, but they have not blossomed again ; they are different from those which have flowered later. I shall speak only of those which flowered later than October.

"In the meantime a new shipment had been made, and as soon as the first general blossoming took place, in October and November, 1890, we found that we were in the presence of *C. labiata* var. *autumnalis.* At a meeting of the Orchidéenne, which was held the 9th day of November, A. Van Imschoot, of Ghent, and the Count of Bousies exhibited the old type of this species. The entire force of the Orchidéenne, composed of Messrs. James O'Brien, J. Linden, Count of Bousies, F. Kegeljan, Massange de Louvrex, G. Miteau, J. Moens, Em. Rodigas, Dr. Van Cauwelaert, A. Van Imschoot, and E. Wallaert, were of the opinion that there existed no difference between these two plants and the *Cattleya Warocqueana* exhibited by us, unless, perhaps, certain varieties of *C. Warocqueana* had a more highly colored labellum. Mr. O'Brien, especially, emphatically asserted this in the *Gardeners' Chronicle* of November 15, 1890, while relating his visit here. Some of the varieties are so exactly like the true 'autumn-flowering labiata' that actual comparison with the true plant, and careful scrutiny by several good judges, failed to find a point whereby those forms of the new introduction can be separated from it, and which is thought to come from the same locality as the original plant. On the 10th of November, the plant sent to the above meeting being still on exhibition, Jules Hye, of Ghent, sent us a flower of *C. labiata* var. *autumnalis,* which he had acquired at the sale of Mr. Tautz. There was no difference between this flower and the majority of the blossoms in our own houses. I can also give the opinion of Sir Trevor Lawrence, Bart., M. P., President of the Royal Horticultural Society of London. During a visit which he paid to the *Horticulture Internationale* about two

Cattleya labiata.

weeks ago, he declared to me that he had immediately recognized *C. Warocqueana* as the true *C. labiata* var. *autumnalis* of old.

"Since November, 1890, the identity of these two orchids has been perfectly established in our eyes, as well as in those of other connoisseurs. It is easy to see why the plant had not been recognized from the first, since *C. Warocqueana* had produced only a few flowers, formed during the voyage, and was, therefore, called a distinct variety. But as soon as a considerable number of the flowers opened, so that one could judge of a large proportion of the plants, it became evident that, as a type, *C. Warocqueana* was identical with *C. labiata* var. *autumnalis*. Nevertheless, as I said in November, I do not hesitate to retain the name *Warocqueana*, because the importance of the reintroduction in 1890, and the large number of splendid varieties hitherto unknown which have been added to our cattleyas, make of this latter fact a very important event. It is only since May of 1890 that this orchid has really become a cultivated plant, for, as Mr. O'Brien said, the old cattleya was scarcely a sample of what was to follow."

Cattleya labiata.

The plant was independently introduced by Sander & Co., of St. Albans, England, during the year.*

An account of the orchids introduced into England during the year is given below by W. Watson, of the Royal Gardens, Kew:†

"A review of the plants introduced into cultivation and described in various periodicals for the first time during 1891, does not reveal much of very decided value. Orchids stand a long way first in point of number. There are exceptionally few new introductions of any note. The hybrids, too, fall short in interest of those of the previous year. Of species, hybrids and wild varieties, there are altogether seventy additions. Besides these, there are those orchids which had previously been rare, but are now abundant in gardens in consequence of large importations made last year. The most noteworthy of these are *Cattleya labiata* var. *vera* (*Warocqueana*)‡ and *Dendrobium Phalænopsis*. *Cattleya Rex* is another recent acquisition of quite exceptional prominence.

New plants in England.

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* For further accounts of the reintroduction of *Cattleya labiata*, see L'Orchidophile, xi.; 262, 310; Journ. des Orchidées, i. 280; Etoile Belge, Nov. 1, 1891; Revue Hort. lxiii. 437, 510; Garden, xxxviii. 470, xl. 333; Gard. Chron. 3 series, viii. 560, 661. Northern Gardener, vi. 194.

† Garden and Forest, v. 30. ‡ ANNALS for 1890, 57, 59.

"*Ada Lehmanni*, Rolfe, differs chiefly in the foliage from the well-known *A. aurantiaca*.

"*Aerides Laurenciæ* var. *Amesiana*, Sander, is a grand variety of a grand orchid. It has racemes over two feet long, crowded with larger flowers than those of the type (Sander & Co).

"*Angræcum fragrans*, Spreng., is an interesting little species of economic value in the Island of Bourbon, where its leaves, when dry, are used as tea. (Kew.)

"*Cattleya Lowryana*, Hort., is a pretty hybrid, raised by F. Sander & Co., and described by me in *Garden and Forest*, iv. 292.

"*Cirrhopetalum Collettii*, Hemsley, is the largest, handsomest and most remarkable species of a remarkable genus. It was discovered in upper Burma by General Collett, and sent by him to Kew, where it flowered for the first time in June last. *C. Wendlandianum*, Kranzlin, is described as a new species which combines the characters of *C. Medusæ* and *C. fimbriatum*. It is not unlike General Collett' s plant, and comes from the same country.

New English plants.

"*Cœlogyne Micholitziana*, Kranzlin, is a white-flowered species in the way of *C. speciosa*, which Messrs. Sander & Co. introduced from Macassar.

"*Cochlioda Nœzliana*, Rolfe, is a charming little orchid for the coolhouse, easy to manage, free-flowering, with elegant racemes of orange-scarlet and yellow flowers. It was introduced in quantity from Peru by Messrs. Linden, Brussels.

"*Cymbidium pulcherrimum*, Hort., Sander, is a beautiful plant, with the habit of *C. Mastersii*, and bears a dozen or so waxy white flowers striped and flushed with crimson. Messrs. Sander & Co. have introduced it from northern India.

"Cypripedium. There are numerous hybrids of this genus, as usual, few being of any real decorative value. The best are *C. Antigone** (from *C. niveum* and *C. Laurencianum*), *C. Berenice* (from *C. Rœbelini* and *C. Lowii*), *C. Ceres* (from *C. hirsutissimum* and *C. Spicerianum*), *C. Castleanum*† (from C. *C. hirsutissimum* and *C. superbiens*).

"*Dendrobium Leeanum*, Hort., Sander, is a species from New Guinea, with the habit of *D. superbiens*, the flowers being white, mottled with rose and tinged with green (F. Sander & Co.)

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*ANNALS for 1890, 57. †ANNALS for 1890, 57.

"*Disa Veitchii*, Hort., is the best hybrid orchid of the year. It was raised by Messrs. J. Veitch & Sons from *D. grandiflora* and *D. racemosa*, flowering within two years of the time the seeds were sown. We have made the same cross at Kew, besides other crosses between these and *D. tripetaloides*, and the seeds have germinated freely. It was proved long ago by Dr. Moore, of Glasnevin, that disas can be easily multiplied by means of seeds. I am of opinion that in the three species here named, we have very promising material for the production of a really valuable race of easily-grown cool orchids.

"*Epidendrum Dellense*, O'Brien, is a pretty hybrid from *E. xanthinum* and *E. radicans*. It originated in the garden of Baron Schroeder.

"*Habenaria carnea*, N. E. Brown, has already been noted and figured in *Garden and Forest* (vol. iv. p. 475, fig. 76).

New plants in England.

"*Lælia Arnoldiana*, Hort., is a handsome hybrid between *L. purpurata* and *Cattleya labiata* raised by Messrs. Sander & Co. The flowers are as large as those of *L. purpurata*, while the color is that of a richly-marked form of the cattleya. There is a good figure of it in the *Lindenia*, t. 294. *L. grandis* var. *tenebrosa* is a distinct and beautiful variety, the sepals and petals colored a rich terra-cotta, the lip being crimson, with a broad, wavy margin of white. It also is represented by a good figure in *Lindenia*, t. 290.

"*Masdevallia Rolfeana*,* Kranzlin, is a large-flowered species in the way of *M. velifera*, but colored rich chocolate-brown (Sander & Co.). *M. falcata*, O'Brien, is a hybrid between *M. Lindeni* and *M. Veitchii* which promises to be a good garden plant. It was raised by an English amateur, Mr. D. O. Drewett. *M. Mundyana*, Hort., is a hybrid between *M. Veitchii* and *M. ignea* var. *aurantiaca*, which we owe to the skill of Messrs. F. Sander & Co.

"*Miltonia vexillaria* var. *Leopoldiana* (*Miltonia vexillaria*, var. *Sanderiana*), a beautiful variety which I recently described in *Garden and Forest* (vol. iv. p. 545), I find has been previously figured and described in *Revue de l'Horticulture Belge*, 1891 (page 73), under the name of *M. vexillaria* var. *Leopoldiana*, Reichb. f. 'One of the prettiest and rarest of the varieties of this miltonia is this, which was dedicated by Reichenbach to

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*ANNALS for 1890, 58.

Leopold II. It had been received by Monsieur Pynaert direct from Monsieur Paten, of Antioquia, in Colombia. It has been exhibited before the Horticultural Society of Belgium, and the Royal Society of Agriculture and Botany, at Ghent. It was unanimously awarded a certificate of merit.'

"*Odontoglossum Cookianum*, Rolfe, is a supposed natural hybrid between *O. triumphans* and *O. Sanderianum*. *O. Dellense*, O'Brien, is another so-called natural hybrid, its supposed parents being *O. Pescatorei* and *O. prœnitens*. A third doubtful hybrid is one named *O. Godseffianum*, which is said to suggest *O. Lindleyanum* and *O. triumphans*. It would seem that those who name orchids are less certain than of yore, if one may judge by the number of introduced plants which are now dubbed natural hybrids. It would simplify matters considerably if such plants were either allowed to rank as distinct species or called varieties of those they are most like.

"We have a supposed natural hybrid among oncidiums now, namely, *O. Larkinianum*, whose characters are thought to be a mixture of *O. curtum* and *O. Barclayanum*. I should call it simply a bright-colored variety of *O. curtum*.

Introductions into England

"*Peristeria aspersa*, Rolfe, was described and figured in *Lindenia*, t. 277. It is in the way of *P. pendula*, the pseudobulbs being as large as goose-eggs, and the short pendent raceme crowded with ten flowers, which are almost as large as those of *P. elata*, and colored yellow, thickly speckled with crimson, the lip being blotched with red. It is a fine plant, and was introduced by the Messrs. Linden, from Venezuela.

"*Phajus maculato-grandifolius*, Hort., Veitch, is a hybrid between the two species indicated in the name. It has the habit of the latter species, tawny, yellow flowers, with a poor lip, a character derived from *P. maculatus*.

"*Renanthera Imschootiana*, Rolfe, is a pretty addition to the genus. It is very similar to *R. Storeyi*.

"*Restrepia striata*, Rolfe, is a charming little orchid, exactly like *R. elegans*, but with striped instead of spotted sepals. It was introduced from New Granada by Low & Co.

"*Schomburgkia Sanderiana*, Rolfe, is similar to the bull's-horn species, *S. tibicinus*, but with shorter pseudobulbs and rosy, carmine flowers. The worst character in the plants of this genus is their shy-flowering behavior under cultivation.

"*Sobralia macrantha*, var. *Keinastiana*, Hort., is a white-flowered variety, as already noted in *Garden and Forest* (vol. iv. p. 305). It is in the collection of Baron Schroeder.

"*Spathologlottis Ericsonii* is a yellow-flowered species, which has been introduced by Messrs. F. Sander & Co., but I have not seen it. Possibly it is from *S. aurea.*

"*Stenoglottis longifolia*, Hook. f., is a pretty, easily-cultivated orchid, for the coolhouse. It has been introduced from Natal to Kew, where it flowered this year, the erect scape, eighteen inches high, bearing its deep, mauve flowers for about three months.

"*Thunia Mastersiana*, Kranzlin, is a tall, long-leaved plant, with flowers about half the size of *T. alba.* It has been introduced from Monlmien by Messrs. F. Sander & Co."

New florists' plants.

Among the *new plants* which are receiving unusual attention from general florists at present are the streptocarpuses, cannas, gladioli, the Darwin tulips—especially abroad—carnations, chrysanthemums, and many aquatics. The best account of the particular merits of the newer introductions in these and other groups, was compiled this year from the experiences of various florists by William Falconer, and presented to the meeting of the Society of American Florists, at Toronto.*

Darwin tulips.

The Darwin tulips, which have attracted much attention in Europe, are thus described by the editor of *Revue Horticole:* † "Many persons will remember having seen some Darwin tulips at the general exhibition at Paris in the spring of 1889. They were exhibited by Messrs. Krelage, of Haarlem, Holland. The flowers were almost spherical, firmly carried, and of brilliant colors, the most common shade being red. Since the above date the varieties have increased enormously; the plants are showing their good qualities more and more, one of the most important features being the power of resistance to sun and rain. It is also asserted that Messrs. Krelage have fulfilled the dream of the 'black tulip' of Alexander Dumas, and that they have obtained a variety which posseses the black color to a greater degree than does any other known flower. The Darwin tulips give us a new race of flowers, and one which will undoubtedly find great favor with all lovers of bulbous plants." This remarkable strain of tulips is named in memory of Charles Darwin, because of his deep interest in the variations of cultivated plants.

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*See Proc. Soc. Am. Fl. vii. 103-145.

†Rev. Hort. lxiii. 510 (Nov. 16, 1891). See also Gard. Chron. Oct. 31, 1891, p. 520, and plate.

The plants which have attracted attention in England during 1891, are discussed as follows by W. Watson, of Kew, in *Garden and Forest:**

Green-house plants.

"Stove and Greenhouse plants.—Exclusive of orchids, the best new stove and greenhouse plants introduced into cultivation last year must be credited to Kew. Few trade collectors think it worth while to pay any attention to foliage or flowering plants, other than orchids, for the reason that, as a rule, there is not much money in them. The botanical gardens in the colonies, and numerous correspondents in various parts of the world, however, send to Kew various interesting and good decorative plants, and these are eventually distributed among nurserymen and others who desire to try them. Of the fifty or so new stove and greenhouse plants recorded, the following are of most promise horticulturally:

"*Alberta magna.*—Mr. W. Bull offered this plant in his catalogue of new plants for last year. It has been in cultivation several years at Kew, but, so far as I know, it has never yet flowered in England. It is rubiaceous, closely allied to cinchona, which it resembles in habit and foliage; the flowers, which are small, are in dense panicles, and colored bright red. It will most likely prove a good greenhouse plant, as it comes from a high altitude in Natal. The treatment which suits luculia ought to answer for the alberta.

"*Allamanda Williamsii*, Hort.—Probably only one of the many forms of the variable *A. cathartica*, but differing from those previously known in gardens by its shrubby habit and floriferousness. It has been brought into notice by B. S. Williams & Son.

"*Aristolochia gigas* var. *Sturtevantii*, Watson.—This came to Kew from Mr. Sturtevant. It flowered freely in one of the tropical houses, and, so far at any rate as Europe is concerned, it was the most remarkable new plant of the year. It is named in compliment to Mr. E. D. Sturtevant, of New Jersey.†

"*Brownea Crawfordii*, Watson.—This is a hybrid between *B. grandiceps* and *B. macrophylla*, which flowered at Kew last year, and was named in compliment to the late W. H. Crawford, of Cork, who raised it. In the size of the inflorescence and color of the flowers, it is even superior to *B. grandiceps*.

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*Garden and Forest, v. 40. †Garden and Forest, iv. 546.

"*Bauhinia Galpini*, N.E.Br.—This is a most promising flowering shrub for the warm greenhouse which has been introduced to Kew from the Transvaal. It has two-lobed leaves and crowded racemes of large handsome crimson flowers, borne on numerous twiggy branches. It grows to a height of about six feet. A figure of it was published in *Hooker's Icones* last year (pl. 1994.)

"*Crinum Roozenianum*, O'Brien.—This is said to be near *C. Americanum*, although the growth resembles *C. erubescens*. The flowers are four to twelve in an umbel, six to eight inches long, with recurved segments three to four inches long and three-fourths of an inch wide, white. It has been introduced from Jamaica by A. Roozen & Co., Haarlem.

'*Cocos Pynaertii*, Hort., is a seedling form of *C. Weddelliana*, with very narrow leaf-segments. It was raised by Monsieur Pynaert, of Ghent, and figured in the *Revue de l'Horticulture Belge* last year (p. 91, fig. 15) under the name of *C. minima glauca*.

New greenhouse plants.

"*Cliveucharis pulchra*, Hort.—It was stated last year that L. Van Houtte, of Ghent, had succeeded in raising a bigeneric hybrid from clivea and *Eucharis Amazonica*, of which further detail would presently be published. Such a cross, if successful, cannot fail to be of exceptional interest.

"*Dipladenia illustris* var. *glabra*, is a handsome stove-climber with a woody root-stock, annual climbing stems, thick ovate leaves, and large, rosy red flowers. It has been introduced from Brazil, and flowered at Kew last year.

"*Epiphyllum Gaertneri* was introduced several years ago under the names *E. Makoyanum* and *E. Russellianum* var. *Gaertneri*. It was at first supposed to be a hybrid between cereus and epiphyllum, but it now proves to be an introduction from Brazil and a third good species of epiphyllum. It is a beautiful stove-plant, at least equal to the best of the varieties of this genus grown, and at the same time abundantly distinct from them all. A figure of it was published in the *Botanical Magazine* (t. 7201).

"*Impatiens mirabilis*.—This extraordinary species is a native of Malaya, where it forms an erect, naked, succulent trunk four feet high, and as thick as a man's leg; leaves nearly a foot long, and large inflated, fleshy, golden yellow flowers. It flowered at Kew, and was figured in *Botanical Magazine* (t. 7195).

"*Lilium Lowii*, Baker.—This is a new species, similar to *L. Nepalense*, with white flowers. It has been introduced from northern India by Messrs. H. Low & Co.

"*Moræa*, or *Iris*, *Robinsoniana* is not a new plant, but its flowering at Kew last year for the first time revealed its true character, which is that of a handsome floriferous iris of exceptional dimensions.

"*Nerine pancratioides*, Baker, is a new addition to the genus, which Mr. O'Brien has introduced from Natal. It has long, narrow leaves, a scape two feet high bearing an umbel of from twelve to twenty flowers one inch long, with small square bifid scales between the filaments.

"*Primula imperialis*, Jungh.—This is the gigantic primrose from the mountains of Java, which was raised at Kew from imported seeds, and flowered for the first time last year. It has a broad rosette of leaves, each fifteen inches long by five inches wide, an erect scape three to four feet high, bearing whorls of deep yellow flowers.

New greenhouse plants.

"*Primula Poissonii*, Franchet, is a new and beautiful species from Yun-nan, which flowered at Kew in June last. It resembles *P. Japonica* in habit, but differs in the leaves and in the color of the flowers, which is rich, rosy mauve, with a yellow eye. A single plant of this species has produced no less than twelve scapes in one season.

"*Streptocarpus Galpini*, Hook. f.—I described this in *Garden and Forest*, vol. iv. p. 534, from plants which have been introduced at Kew from Transvaal. It is the prettiest of all the species of this genus.

"*Thrinax Morrisii*, Wendl.—This was discovered by Mr. D. Morris, the Assistant Director at Kew, in the island of Anguilla, in the West Indies. It differs from all known species of thrinax in the dwarfness of its stature, none of the many mature plants seen by Mr. Morris exceeding three feet in height. It has elegant foliage, and promises to be a useful garden palm.

"*Tulbaghia Natalensis*, Baker, is a Cape bulb, with no more beauty than mignonette, but, like the latter, it has the charm of delightful fragrance. It has been introduced to Kew from Natal. *T. alliacea* is cultivated for the sake of its purple flowers; its linear leaves have a strong onion-like odor.

"*Wahlenbergia undulata*, Cham.—A straggling herbaceous plant, which may be grown in suspended baskets, so that its thin leafy stems may hang and display its companulate deep blue flowers. It has been introduced from the Cape to Kew.

New greenhouse plants.

"Among popular greenhouse-plants, perhaps the most noteworthy additions last year were the beautiful dwarf cannas, whose large, richly-colored flowers and good nature under ordinary cultivation have made them prime favorites in England. Two pretty Japanese varieties of *Azalia amœna*, hardy in England, were sent out by J. Veitch & Sons. This firm has also added many new varieties of greenhouse rhododendrons and hippeastrums.

New herbaceous plants.

"Herbaceous Plants. There was an extraordinary number of varieties of popular harbaceous plants introduced last year, such things as dahlias, gladioli, pæonias, carnations, rudbeckias, delphiniums and irises being considerably reinforced by additional sorts of first-rate character. Of new species there were very few, the best of them being as follows: *Chionodoxa grandiflora*, a variety of *C. Luciliæ*, with erect racemes and larger flowers than the type. It was previously known as *C. gigantea* (T. S. Ware & Co.). *Galanthus Alleni*, Baker, a pretty addition to cultivated snowdrops, characterized by short broad leaves and pure white flowers (Caucasus). *G. nivalis* var. *Elsæ*, Burbidge, a variety with larger flowers and broader leaves than *G. Corcyrensis*, from Macedonia. Another variety, named *Racheliæ*, Burbidge, has larger flowers than the last-named, and blossoms in October and November. *Iris Fosteri*, Baker, is a handsome species of the *Caucasica* group. It has yellow flowers blotched with deep violet. *Lilium Brownii* var. *chloraster*, Baker, is a new introduction to Kew from western China, and differs from the type in having broader leaves, larger flowers, with a broad green midrib to each segment, and deep red pollen. *L. Martagon* × *Hansoni*, Baker, is a hybrid raised by C. G. Van Tubergen, Haarlem, from the two species indicated in the name. *Watsonia densiflora* var. *alba* is a very pretty Cape bulb which has so far stood outdoors at Kew, where it flowered for the first time last year. It has erect spikes eighteen inches high, with the flowers in a dense head like a ripe wheat-ear, pure white."

Greenhouses. Many departures are making in the construction of glass houses for florists' use. One of the most important innovations is the tendency to use the common wrought-iron steam or gas-pipes for heating purposes, in preference to the old cast-iron pipes, both for hot water under pressure and steam-heating; and this has introduced a system of overhead piping which has overturned some of the common notions of greenhouse-heating. Steam is also contending for supremacy over hot-water, but neither agent can be said to have made signal victories for general purposes. It will undoubtedly be found that both agents possess superior advantages for particular purposes. The fact that steam has often dislodged hot water systems, is proof that it possesses decided merit in some cases. No thoroughly satisfactory tests have been made upon the relative merits of steam and hot water for modern greenhouse-heating.

Greenhouses.

In greenhouse construction there is an evident tendency towards simplicity, which is itself a positive indication that the greenhouse business is becoming more practical. The tendency is towards large to very large glass and light frames. Glass as large as 20 × 30 inches is sometimes used for roofing. Iron rafters are coming into frequent use, because of their durability and little obstruction to sunlight. Iron-frame and slate-top benches are making their way from conservatories into forcing-houses and propagating-pits.

Some of the recent movements in greenhouse construction in France are discussed as follows by Maximilien Ringelmann* in a report upon horticultural arts and industries as displayed at the Exposition of the National Society of Horticulture of France:

"One division of the general exposition embraced horticultural arts and industries. It was divided into four sections. The first section included greenhouses, sash, frames, screens, garden-matting, and apparatus for heating. There were 55 exhibitors. The second section included tools and machines, sprayers, garden furniture, etc. There were 40 exhibitors. The third section comprised arbors, rustic constructions, kiosques, etc., there being 48 exhibitors. Finally, 65 exhibitors entered the fourth section, which embraced various arts, pottery, basket-making, cutlery, scales, bric-abrac, fertilizers, and insecticides. The total number of exhibitors, many of whom made exhibits in several different sections, was 175.

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*Revue Horticole, 1891, 277.

Wood *vs.* iron houses.

“The first section [which alone we shall discuss] embraced in principle all constructions which are designed to protect plants from the weather, the temperature, light and humidity within being to a certain extent under control. These constructions are permanent or temporary. The permanent ones are known as greenhouses; coldframes, hotbeds, and other moveable structures are included in the temporary constructions. The framework of the houses is of wood or iron, or both. There has been much discussion in regard to which material is the better, but by taking a scientific and practical view of the matter all can be summed up in the following sentence: A house should have as much light as possible, and this is obtained by using glass upon as small a framework as is consistent with strength.

“In making arrangements for heating a house, its glass surface must be taken into consideration, for the transmission of heat is more rapid through some bodies than through others. If the radiation of heat from glass is taken as a unit, the other substances which are of interest will, under the same conditions, radiate the following amounts of heat:

Glass	1.0	per cent.
Wood	0.2	“
Iron	35.0	“
Brick	0.8	“

If we assume that the glass covering the house is 30 centimeters* [nearly twelve inches] wide, the wooden sash-bars three centimeters wide, and the iron ones 5 millimeters† [about 1-5 inch] wide, it will be seen that the relative amounts of the heat radiated will be 30.6 per cent. for wood frames, and 47.5 per cent. for iron frames.

“In other words, the iron will allow 20 per cent. more heat to be lost than the wood, other conditions being equal. This loss can only be made up by burning a larger amount of fuel and having a greater amount of heating-surface in order to avoid great variations of temperature. Wooden frames are preferable so far as heating is concerned, but they are practi-

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*A centimeter is .3937 inches. *A millimeter is .03937 inches.

cable only for small houses. But they are more expensive to keep in repair, and are not so durable. The lines for such a house are straight, and for this reason the structures are not so handsome as the iron ones.

Wood *vs.* iron framework.

"Five men exhibited models of houses with wood frames. The frames were mostly of pitch-pine, the parts being held together by plates or castings of iron. About twenty exhibits of iron-framed houses were made. Such houses are generally more durable, and their arched roofs give them a much more elegant appearance than houses which have the framework of wood. But the question of radiation must be considered. In very cold weather the moisture which collects upon the iron falls upon the plants in perfect showers. Sash-bars so formed that the water will be carried in grooves to the side of the house were exhibited. In order to retain the advantages of both iron and wood, some builders exhibited models in which the iron frame was covered with a lining of wood. This lining is used only in the interior of the house; it is fastened to the iron by means of clamps, and can be removed when desired.

Double glazing.

"Some builders put two layers of glass upon their houses in order to diminish the radiation of heat. This method of glazing can be used on houses having a frame of wood, or of wood and iron. The inner glass is not puttied, but is held in place by small hooks, or by strips fastened to the sash-bars. One house had small ventilators so arranged that a current of air passed between the two layers of glass, thus keeping the glass free from condensed moisture.

"I shall not describe the various contrivances for opening ventilators, each exhibitor having a different device, a simple handle, an iron rod, levers, etc. The ventilators, also, were of many sizes and of different shapes.

Frames.

"A large number of builders exhibited frames designed to protect plants trained upon walls. These frames contained movable panes of glass; the lower parts of some contained panels of wood which fitted into grooved iron bars. The glass is fastened to iron bars, also, these bars being grooved to carry away the condensed moisture which collects upon the glass. A peculiar sash was exhibited by one builder. It is called the 'universal frame'; its size is about 4½ × 1½ feet, and it contains four panes of glass. These frames can be used for protecting espaliers, and in many cases they can take the place of the hand-light commonly used in gardens. The frames are provided with hooks, so that four or six of them may be fastened together, thus making small glass houses with even-span roofs.

New system of glazing.

"An interesting system of glazing was also exhibited. It was designed to diminish or entirely do away with the dripping of condensed moisture. Each pane of glass is held in place by a clasp, and the panes are separated from each other by a strip of zinc, bent so that a section presents the form of a V. These strips are fastened with putty near the upper end of each pane, and they receive the water from the pane above. In each strip is a small hole, through which the water flows to the outer surface of the glass."

The year.

The year has been a prosperous one for florists. Trade has been good in all the popular groups of plants. The Easter trade was the largest on record, and more attention is being bestowed year by year upon the decorations at society events. The year has witnessed the birth of the florists' telegraph delivery system, and has still further demonstrated the merits of hail insurance.

In Europe the last winter was unusually severe, and outdoor plants suffered greatly, and it is said that this injury had considerable influence upon the exhibitions of the year. The following report of the ornamental plants shown at the General Agricultural Exhibition at Paris this year, is contributed by Ed. André, to the *Revue Horticole :*

The year in Europe.

"The exceptional severity of the winter 1890–91, naturally had an injurious effect upon the Agricultural Exhibition, which was held in the Palais de l'Industrie. Nevertheless, the number of exhibits made was unexpected. The ingenuity displayed by growers in preserving their exhibits under the most adverse circumstances was admirable, extraordinary efforts often having been made in this direction.

"Among outdoor plants, only one lot from the open, where plants were generally injured by the cold, was exhibited. Honoré Defresne, a nurseryman at Vitry-sur-Seine, had the happy thought to protect many beautiful specimens of evergreen shrubs and conifers before the approach of winter. This enabled him to exhibit remarkable groups of plants, all of which showed excellent culture. The most noticeable plants among the conifers were *Picea excelsa* var. *Remonti, Abies concolor* var. *violacea, Juniperus Virginiana* var. *elegans, Biota orientalis* var. *elegantissima, B. filiformis* var. *erecta,* and *Thuya vervæneana. Ligustrum coriaceum, Eriobotrya Japonica, Nandina domestica,* euonymuses, privets and box were particularly attractive among the shrubs.

"Of greenhouse plants, although the exhibits were less numerous than usual, the arrangement was exceptionally beautiful. Mr. Chantin, a veteran who is always at the front, had a non-competitive exhibit of palms, among which were *Areca sapida, Corypha australis, Chamærops excelsa,* etc., and some cycads, as *Zamia horrida.* The exhibit of Mr. Dallé was extensive. It consisted of palms and evergreen plants from the coolhouse, all of which were in excellent condition. *Kentia Belmoreana, Cocos Datil, Kentia Forsteriana,* various arecas, chamærops, etc., were mingled with ferns, dracænas, marantas, phormium, etc., which have become indispensable occupants of greenhouses and conservatories. Close by were the orchids of the same exhibitor, and these were also universally admired. Truly it is a rare talent to be able to exhibit so many of these plants in such perfect flower at a season of the year which is so cold and gloomy. The plants particularly noticeable were the beautiful *Cattleya Percivaliana, Pilumna nobilis, Vanda suavis,* several well-colored dendrobiums, some interesting cypripediums, oncidiums with gold and maroon tints, *Odontoglossum crispum,* both white and rose varieties, *Mesospinidium* with violet clusters, etc.

Exhibitions in France.

"There was nothing more graceful than the arrangement of the bulbous plants exhibited by Vilmorin-Andrieux & Co. The plants were placed near one of the partitions of the hall, upon a staging which rose from the ground in the form of an amphitheater. Hyacinths, tulips, crocus, narcissuses, cyclamens, lilies-of-the-valley, anemones, and many other beautiful flowers which announce the approach of spring, all delighted the eyes of visitors with the superiority of their colors and their artistic grouping. Elegant groups of cyclamens were exhibited by Forgeot & Co. Among them could be seen the new variety, Roi des Noirs, which is of a deep violet color; also, *Scilla Siberica,* with its pretty blue flowers; begonia Gloire de Sceaux, and primulas.

"In the center of the hall was a group of forced lilacs, which again gave evidence of the long experience which Mr. Léveque has had in their culture.

Chrysanthemums in France.

"Mr. Boutreux has demonstrated that nothing is impossible to our horticulturists, and that obtaining flowers out of season is only a pastime. His lot of flowering chrysanthemums which had been held back by peculiar treatment, showed a system of culture which is but little known ; and it cannot be doubted that the results obtained by it will stimulate all lovers of this Japanese flower to further work in this direction. Among the varieties exhibited, mention may be made of Meyerber, rose-violet ; Cullingfordi, yellow ; Docteur Sagali, yellow ; Pelican, long rays white ; Citron, sulphur-yellow ; Th. Bullier, violet ; Vilmorin, straight rays yellow ; Soleil d'Or, bright yellow, etc."

Statistics of floriculture.

The florists' business is now enjoying a rapid extension in America, and it is taking its place as one of the important industries. The present status of the business was the subject of Bulletin 59 (April 29, 1891) of the Eleventh Census. The following editorial review of the bulletin appeared in the *American Garden* for June : "The bulletin shows that flower-growing has already reached enormous proportions, especially in the older portions of the country and in California. The business is in a thriving condition, as evidenced by the fact that the number of establishments is rapidly increasing. In 1800 there was but one commercial florist in the United States. Between 1810 and 1820 three establishments started ; eight more were started in the next decade, twenty-five in the next, 45 between 1840 and 1850, 96 in the next, 313 in the next, 998 between 1870 and 1880, and 1,797 in the last decade. There are 4,659 commercial establishments in the country now (1890), using 38,823,247 square feet of glass, and heated with apparatus valued at $38,355,722.43. Tools are valued at $1,587,693.93. New Jersey has the largest floricultural business of any state in proportion to its size. There is not one establishment, so far as learned, in Idaho, Nevada and Indian Territory. 312 of these establishments are owned and conducted by women, and 1,958 women are engaged in the business in the United States. This indicates that women may here find a delightful means of livelihood. The inception of this investigation of the floriculture of the country is said to have come from Mrs. Porter, wife of the Superintendent of the Census, and the following statement has gone the rounds of the press: The bulletin 'is understood to be the result of a suggestion made by the accomplished wife of the Superintendent of the Census, with a view to opening up a new avenue of employment for women. Superintendent Porter, from the day he received his appointment until now, has been worn down by pitiful appeals from women for employment. Without straining facts, it might be said that the proportion of rejected women applicants was as high as ninety-nine out of a hundred. Many of those disappointed took a woman's chance and appealed to the wife of the superintendent, who, seeing so many helpless females in the world, turned her mind to devising some new opening to employment. The result was the special report on floriculture which now appears, and which was made at her suggestion.'

Statistics of floriculture.

"The total value of the floricultural product for one year was $26,211,805.77, of which $14,175,328.01 was for cut-flowers and the remainder for plants. Of the plants sold, 49,056,253 were rose-bushes, and 38,380,872 were hardy plants and shrubs, while the total number of all plants sold was 240,272,417. It required 18,805 people to grow these plants and cut-flowers, at an aggregate wage of $8,483,657. All this business required an outlay of $1,161,168.31 for advertising, and the issuing of 21,055,694 catalogues, and the estimated freight and express bills on outgoing shipments was $1,086,904.60.

"'Of the plants sold, the demand in the northern and eastern states is greatest for geraniums, coleus, roses, pansies, verbenas, heliotropes, carnations, chrysanthemums, palms, ferns and fuchsias, nearly in the order named. In the south the demand is for roses, chrysanthemums, geraniums, coleus, palms and ferns; while California shows the demand to be the largest for roses, carnations, chrysanthemums, geraniums, palms and pansies. For cut-flowers, roses lead, followed closely by carnations.'"

Flower-seed growing has not assumed large proportions in this country, largely, no doubt, because of the high price of labor. The value per acre of the "planting-stock," *i. e.*, the seeds and plants set for the crop, is said to range "from $6 to $25, according to variety." "The yield per acre of flower seed is from 10 to 1,000 pounds, according to variety." "The returns show a selling-price of flower seeds ranging from 3 cents to $50 per pound. It is therefore impossible to make an average price where there is such a vast difference, and the various species and varieties are not given."

The Census bulletin (No. 111) upon seed farms reports a few general figures concerning the business, all of which are tabulated below:

Flower seed industry.

FLOWER-SEED STATISTICS.

State.	*Acreage in flowers for seed, 1890.*	*Cost of fertilizers per acre.*	*Cost of labor per acre.*
Massachusetts	7	$25.00	$50.00
New York	12	22.50	37.50
New Jersey	2	20.00	40.00
Pennsylvania	10	29.00	100.00
Georgia	4	———	90.00
Florida	6	———	45.00
Ohio	4	———	5.00
Iowa	20	———	12.00
California	16	———	———
Total	81		

§ 3. *Plant-Diseases and Insects.*

The year has been characterized, as a whole, by comparative freedom from insect and fungous injuries to horticultural crops, although there have been the usual losses from the depredations of the rose-chafer, the plum-knot, peach-yellows and some other abiding pests. Dealers everywhere declare that the apples are unusually free from worms and scabiness, and the same may be said of most orchard fruits. A number of new or little-known fruit-pests have attracted attention—the more alarming ones being, probably, the pear-midge (*Diplosis pyrivora*) which has been mischievous along the Hudson, and the pear-tree psylla (*Psylla pyri*, or a related species) in some parts of the east. There appears to have been great activity in the experiment stations in the study of injurious insects and plant-diseases. The constant repetition of advice from the stations, and the accumulation of a literature upon almost every enemy to the farmer, are having the effect of awakening the public to an appreciation of the enormous annual losses occasioned by insects and fungi ; and it is bearing fruit in legislation designed to control the depredations. Upon this point, Professor James Fletcher speaks as follows in his inaugural address as president of the Association of Economic Entomologists :* "We find upon investigation that accurate estimates of damage done by insects are exceedingly difficult to arrive at, and the figures are so large that we are rather afraid to quote them ourselves lest we should prevent rather than encourage investigation, and it has been the custom of entomologists to minimize the estimates for fear they should not be believed. Now the necessity has arisen, I think, and I lay it before the association for action, in the direction of gathering together some reliable recent statistics in a short form which may be printed for distribution, and which will cover the more important injuries to date, and the part the work of the entomologist has played in reducing injury or preventing loss, so that we may overcome this difficulty and provide legislators and ourselves with data with which to meet this argument. After a careful examination and great effort to obtain data, I have found that there are certain of these large estimates which appear to be reliable. I think better results will follow the publication of a few quite reliable statistics, which may be taken as typical instances, than by accumulating a large number of items which would increase the chance of error and might not be read so carefully. By way of example I will refer to the chinch-bug. I have examined carefully the estimates which have been published concerning that particular insect, and the following are probably quite reliable and appear to have been made with due regard to all collateral considerations—as the increased value of the saved crop, the cost of remedial measures, and similar subjects.

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*Before the third annual meeting, held in Washington, D. C., Aug. 17 and 18, 1891. See Insect Life, iv. 4.

"In 1864 Dr. Shimer's estimate, which I find was drawn up with very great care, put the loss in the one state of Illinois to the corn and grain crops at $73,000,000. In Dr. Riley's reports on the injurious insects of Missouri, we find in 1874 there was a reliable estimate of the loss to that state by the same insect of $19,000,000. In 1887 Professor Osborne's estimate, founded upon the reports of the correspondence of the State Agricultural Society of Iowa, put the loss in that state on corn and grain at $25,000,000; and lastly, Mr. Howard's estimate, as given in the entomologist's report for 1887, for the nine states infested by the chinch-bug in that year, was $60,000,000. Now, gentlemen, I think that these statistics of the injuries to crops by one insect alone are probably as reliable as any we can get, and they give a good argument which we may use as showing the depredations of insects. But it is not sufficient that we can convince people that great injury is going on; we must show that we are doing something to mitigate this injury. In Professor Comstock's report for 1879 the estimate of the possible loss in years of general prevalence of the cotton-aletia is placed at $30,000,000 through the cotton states. The injuries by grasshoppers in the different states of the Union and also occasionally through the British North American provinces, have been so great that figures hardly give an idea of the injury they do, but they are known by all to be enormous.

"As an instance, however, of what may be done to mitigate their attacks, I would merely mention those for this year, which seem to have been very considerable. In the states of North Dakota and Minnesota it is probable that at least $400,000 have been saved on account of work done by direct advice of entomologists—work they have in some instances forced upon the farmers. Two hundred thousand dollars is a probable estimate of the amount saved by plowing the land last autumn. Another equal amount has been saved by the use of 'hopperdozers.' Professor Bruner tells me that a sufficient number of grasshoppers has been actually taken this year, which if left alone and allowed to lay their eggs might next year have devastated the whole crops of those two states and the adjoining parts of Manitoba. These successful operations have been carried on by the state entomologist of Minnesota, Professor Lugger, and by Professor Waldron of North Dakota, ably aided by the advice and assistance of the agent of the Department of Agriculture, Professor Bruner, under Professor Riley's instructions; and I think it is no exaggeration to say that at least $400,000 have been actually saved in hard cash on this year's crop, not to speak of the enormous loss which would most probably have followed next year had they been left alone, and had climatic conditions been favorable for their increase.

"The amount of damage done to crops every year is so vast that the figures excite incredulity from those who do not study crop-statistics. The agricultural products of the United States are estimated at about $3,800,000,000. Of this it is thought that about one-tenth is lost by the ravages of insects. This is in many cases unnecessary. In short, a sum of $380,000,000 is given up without a murmur and almost without a struggle by the people of the United States. Crops of all kinds are injured, and simple remedies are known for many of the attacks and are more or less adopted. Some have already come into general use. Paris green is now applied to potato-fields almost as much as a matter of course, as manure is to fertilize the soil. As an instance of how a saving may be made even in well-established methods, I give the following: Through the work of Mr. W. B. Alwood, of the Virginia experiment station, improved machinery and the water mixtures of poisons have come into general use amongst the farmers and potato-growers in the Norfolk region, and some of the largest growers now claim that they at present do for from $40 to $60 what used to cost them from $500 to $600. To-day in California and Florida orange trees are universally treated with kerosene and resin emulsions or poisonous gas for scale insects. In the treatment of cabbage caterpillars, pyrethrum diluted with four times its weight of common flour, and then kept tightly closed for 24 hours, leaves nothing to be desired, and thousands of dollars are yearly saved to small growers who most need the assistance.

"Many excellent remedies have been devised by a mere modification of existing agricultural methods. Instances of these are found in the early and late sowing or harvesting of some crops, as sowing turnips between the broods of the turnip flea-beetle, the late planting of cabbage for the root-maggot, the late sowing of wheat for the Hessian fly, etc. In the 1879 report of the United States Department of Agriculture was first detailed the only successful method of treating the clover-seed midge by cutting or feeding off the first crop before the young larvæ are sufficiently matured to leave the heads and go into the ground to pupate. This was simply a change of one week, by which not only is the insect destroyed, but the clover is saved in better condition than under the old method."

Attention is now being given to devising laws to aid in the mitigation of injury from fungi and insects, and within a few years many states will no doubt take steps in this direction. The recent gipsy-moth legislation* in Massachusetts is the most distinct effort yet made in this country to control any insect or plant disease. It is yet too early to prophesy the outcome of the war against the gipsy-moth, for although the results thus far reached are not wholly encouraging, those in charge of the enterprise are sanguine of ultimate success.

Washington has passed "An act to create a State Board of Horticulture," which was approved Feb. 16, 1891, and which provides for an officer known as the "Inspector of Fruit-pests." The regulations are as follows:

"For the purpose of preventing the spread of contagious diseases among fruits and fruit-trees, and for prevention, treatment, cure and extirpation of fruit-pests, and the diseases of fruits and fruit-trees and for the disinfection of grafts, scions, or orchard debris, empty fruit-boxes or packages, and other suspected material or transportable articles dangerous to orchards, fruits and fruit-trees, said board may suggest regulations for the inspection and disinfection thereof, which regulations shall be circulated in printed form, by the board, among the fruit-growers and fruit-dealers of the state, and shall be published at least ten days in two daily papers of general circulation in the state, and which shall be posted in three conspicuous places in each county in the state, one of which shall be at the county court-house thereof.

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*See ANNALS for 1890, p. 75. The law is printed in full in Insect Life, iii. 472 (Aug. 1891). See also discussion in Insect Life, iii. 368.

"The said board shall elect from their own number, or appoint from without their number, to hold office at the pleasure of the board, a competent person especially qualified by practical experience in horticulture, who shall be known as 'inspector of fruit-pests.' It shall be the duty of said inspector to visit the horticultural districts of the State; to see that all the regulations of said board to prevent the spread of fruit-pests and diseases of trees and plants injurious to the horticultural interests of the State, and for the disinfection of fruits, trees, plants, grafts, scions, orchard debris, empty fruit-boxes and packages and other material be made known to the people of the State. He shall, whenever required, and under the direction of the board, and may also upon his own motion, and upon complaint of interested parties, inspect orchards, nurseries and other places suspected or believed to be infected with fruit-pests, or infected with contagious diseases injurious to trees, plants or fruits, and he shall report the fact to said board. The inspector shall, from time to time, and whenever required by said board, report to it such information as he may secure from observation, experience and otherwise, as to the best method of diminishing and eradicating fruit-pests and diseases from orchards, and also suggestions in practical horticulture, the adaptation of produce to soil, climate and markets, and such other facts and information as shall be calculated to improve the horticultural interests of the State.

Washington fruit law.

"Whenever a complaint is made to any member of the board that any person has an orchard, trees or nursery of trees, or a fruit-packing house, store-room, sales-room, or any other place in this State, infected with any noxious insects, or the eggs or larvæ of any such insects, or that any packages of trees, plants or fruit are in transit to this State, or are in this State about to be disseminated, which are known or suspected to be from localities that are infected with any disease or pests injurious, or that may become injurious to the fruit interests of the State, such member shall inspect, or cause to be inspected, the premises or property to which such complaint relates, and if the same is found to be infected as aforesaid, such member shall notify in writing the person having charge of such premises and property to appear before him, at such time and place as specified in such notice, to be heard in reference to the infection of such premises or property aforesaid, and if such member, after hearing the person in charge of such premises or property, shall be of the opinion that such premises or property, or any of the same, is infected as aforesaid, he shall notify in writing the person in charge of the same within a time to be prescribed in said notice; and if the person so notified shall neglect or refuse to treat and disinfect said premises or property in the manner and within the time prescribed in said notice, such person shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than $25 nor more than $100; and if it appears on the trial that any orchard, trees, nursery, building or any other structures, premises or property in charge of the defendant referred to in said notice, or any part of such structures, premises or property is infested or infected as aforesaid, the court shall declare whatsoever of the same is so infected a nuisance, and shall order it to be abated, or may make any other order necessary to prevent its continuance; and it shall be the duty of the board, or some member thereof, to execute such order, and the costs and disbursements of the prosecution shall be adjudged against the party convicted as aforesaid.

Washington fruit law.

"The inspector of fruit-pests shall receive a compensation for his services when actually engaged in the duties of his office, a sum not to exceed $5 per day, and his mileage actually paid out, shall be allowed when so engaged."

The peach-yellows agitation has resulted in the passage of new laws in Delaware and Michigan. The Delaware law applies to only a portion of the State, and therefore fails of its best mission. Michigan was the first State to enact a law against a definite plant-disease, and its law has been the model of other legislation against yellows. Its new law, which was approved June 23, 1891, includes the plum-knot, and is as follows:

"SECTION 1. The people of the State of Michigan enact, That it shall be unlawful for any person to keep any peach, almond, apricot, plum, prune, cherry or nectarine tree, infected with the contagious diseases known as yellows or black-knot, or to offer for sale or shipment, or to sell or ship to others any of the fruit thereof; that both tree and fruit so infected shall be subject to destruction as a public nuisance, as hereinafter provided, and no damage shall be awarded in any court in the State for entering upon premises and destroying such diseased trees or parts of trees and fruit, if done in accordance with the provisions of this act; and it shall be the duty of every person, as soon as he becomes aware of the existence of such disease in any tree, parts of trees, or fruit owned by him, to forthwith destroy or cause said fruit or trees to be destroyed.

New Michigan law.

"SEC. 2. In any township in this State in which said contagious disease exists, or in which there is good reason to think it exists, or danger may be justly apprehended of its introduction, as such information becomes known to the township board or any member thereof, it shall be the duty of said board to appoint forthwith three competent freeholders of said township as commissioners, who shall hold office during the pleasure of said board, and such order of appointmentment and revocation shall be entered at large upon the township records.

"SEC. 3. It shall be the duty of said commissioners, within ten days after appointment as aforesaid, to file their acceptance of the same with the clerk of said township, and said clerk shall be ex-officio clerk of said board of commissioners, and he shall keep a correct record of the proceedings of said board in a book to be provided for the purpose, and shall file and preserve all papers pertaining to the duties and actions of said commissioners, or either of them, which shall be a part of the records of said township.

"SEC. 4. It shall be the duty of the commissioners or any of them, upon or without complaint, whenever it comes to their notice that either of the diseases known as yellows or black-knot exists, or is supposed to exist, within the limits of their townships, to proceed without delay to examine the tree or fruit supposed to be infected ; and if the disease is found to exist, a distinguishing mark shall be placed upon the tree and the owner notified personally, or by a written notice left at his usual place of residence, or, if the owner be a non-resident, by leaving the notice with the person in charge of the trees or fruit, or the person in whose possession said trees or fruit may be. The notice shall contain a simple statement of the facts as found to exist, with an order to effectually uproot and destroy, by fire, or as the commissioners may order, the trees so marked and designated, or such parts thereof within ten days, Sunday excepted, from the date of the service of the notice ; and in case of trees known as nursery stock, or fruit so infected, such notice shall require the person in whose possession or control it is found to immediately destroy the same, or cause it to be done, said notice or order to be signed by the full board of commissioners.

The new Michigan law

"SEC. 5. Whenever any person shall refuse or neglect to comply with the order to remove and destroy the tree or parts of trees so designated and marked by the commissioners as aforesaid, it shall become the duty of the commissioners to cause said tree or parts of trees to be destroyed forthwith, employing all necessary aid for that purpose. The expenses for such removal and destruction of trees or parts of trees to be a charge against the township ; and for the purpose of said removal and destruction, the said commissioners, their agents and workmen, shall have the right and power to enter upon any and all premises within their township.

"SEC. 6. If any owner neglects to uproot and destroy, or cause to be removed and destroyed as aforesaid, such diseased tree or parts of trees or fruit after such examination and notification, and within the time hereinbefore specified, such person shall be deemed guilty of a misdemeanor, and punished by a fine not exceeding $100, or by imprisonment in the county jail not exceeding three months, or both, in the discretion of the court ; and any justice of the peace of the township where such trees may be, or where such nursery stock or fruit is sold, shipped, disposed of, or delivered, as aforesaid, shall have jurisdiction thereof. The words, 'parts of trees,' wherever used in this act, shall refer to black-knot only, and not to trees affected with yellows.

"Sec. 7. The commissioners shall be allowed for services under this act, $2 for each full day, and $1 for each half day, and their other charges and disbursements thereunder, to be audited, as well as any other charges and disbursements under this act, by the township board; all of which costs, charges, expenses and disbursements may be recovered by the township from the owner of said diseased fruit, or from the owner of the premises on which said diseased trees stood, in an action of assumpsit."

California and the yellows.

There has been an energetic movement in California during the year to protect the State from the importation of the yellows. The State Board of Horticulture has issued a pamphlet * upon the subject, giving the opinions of eastern horticulturists upon the probability of the importation of the disease in buds and nursery stock, and giving the California law which empowers horticultural commissioners to inspect orchards and stock, and to eradicate any disease. The California law provides that "it shall be the duty of the inspector of fruit-pests, or the quarantine guardian, to inspect fruit-packages, and all trees and plants, cuttings, grafts and scions, known or believed to be infested by any insect or insects, or the germs thereof, or their eggs, larvæ, or pupæ, injurious to fruit or fruit-trees, or infested with any disease liable to spread contagion, imported or brought into this State from any foreign country, or from any of the United States or Territories; and if, upon inspection, such fruit or fruit-packages are found to be infested or infected, it shall be a misdemeanor to offer the same for sale, gift, distribution or transportation, unless they shall be first disinfected." The State Board of Horticulture last summer passed the following resolutions relative to yellows:

"Whereas, We are informed that some nurserymen, through the scarcity of peach-stocks for budding prunes, have contracted for large lots of eastern peach-stock for budding purposes for next season's delivery; and whereas, there is great danger of introducing into this State the yellows, a deadly disease of the peach, on said roots, and on peach

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*Peach Yellows. By B. M. Lelong, Sacramento.

trees imported from the eastern States ; and while they may not have the disease in the localities where they get this stock, but we, having no guarantee that the eastern growers may not get trees grown in infested sections to supply the California demand ; therefore be it

Yellows agitation.

"Resolved, That we warn intending purchasers of the danger of getting trees infected with the yellows and other tree diseases and pests not now in this State ; and be it further

"Resolved, That we call the attention of all the boards of county horticultural commissioners and quarantine guardians throughout the State to this danger, and urge the rigid enforcement of the law in all such cases."

This experiment of endeavoring to exclude a contagious plant-disease from a given territory will be watched with keen interest by the scientific world. There is a strong feeling against this movement among eastern nurserymen, who contend that the California nurserymen are using the law to prevent competition in the nursery business.

Sprays.

The most important economic result of the year, as regards plant-diseases and insects, is the further demonstration of the value of copper and arsenical sprays, and the popularizing of the necessity of spraying. It is now known beyond question, that by far the larger number of injurious fungi and insects can be practically and economically controlled by a proper spray, and farmers themselves are now among the most ardent advocates of the practice. Paris green and London purple still remain the most powerful weapons against most insects, with the improved kerosene emulsions * still leading for the extermination of plant-lice and similar insects. The United States has led in the use of arsenical sprays, but the prejudice against them in England is being overcome, and their use there is extending. The demand for large quantities of Paris green for fighting the cotton-worm has resulted in the adulteration of the material in the South. Louisiana has enacted a law for the protection of buyers, which requires that Paris green must be sold upon a guaranteed analysis, as commercial fertilizers are sold. "Pure" Paris green must contain at least 50 per cent. of arsenic ; all samples containing less than 50 per cent. are marked "impure." Every package sold is re-

Adulteration of Paris green.

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*See Bull. 76, Mich. Exp. Sta.

quired to bear a label supplied by the commissioner of agriculture, at a cost of 50 cents per 100 pounds.

The particular activities of the year in the experiment stations are indicated by the indexes on a later page (§§ 7 and 8, Part II.), and few of them need be discussed here.* The insects which have most persistently baffled the skill of the experimenters are the rose-chafer and the wire-worm, both of which have been the subject of close investigation during the year. No practical remedies have yet been devised against the rose-chafer, and the greatest reliance must still be placed upon various methods of gathering the beetles. E. S. Carman, editor of the *Rural New-Yorker,* has discovered that water at a temperature of 125 degrees to 130 degrees Fahr., will kill the insects, but it is practically impossible to apply water at this temperature to trees, although it may be accomplished on grape-vines. The insects breed on light or sandy soil, and seem to prefer sod-land. Professor J. B. Smith, therefore, advises† to "prevent the breeding of the insects on your own land. This can be done by using the heaviest land, only, for grass, and keeping just as little light land as possible in sod. As the insects pupate early in May, a thorough cultivation of all the ground that can be cultivated will turn up and destroy a large proportion in this stage. Either late in fall or early in spring, land should be plowed and top-dressed with kainit. Where light grass-land is to be put into use, plowing at this time would be most effective in destroying the insects. Vineyards, especially, should be deeply and thoroughly cultivated in May, to turn up and destroy pupæ. The clearer the land is kept, the fewer insects will come to maturity. A great point is gained if the enemy must come from the outside, and does not appear everywhere in the vineyard at one time."

Rose-chafer.

Wire-worms.

The wire-worms have been the subject of an extensive investigation by Professor Comstock, of Cornell University.‡ No positive remedies have been found, however. A short rotation is one of the best means of lessening injury, as is also fall plowing. All the old remedies—as salt, lime, the growing of buckwheat and other supposed immune crops, soaking seeds in copperas or poisons—are found to be of no avail. The bulletin has added much to our knowledge of the insects, however, and will open the way to more intelligent experimentation than has been employed in the past.

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*An epitome of the new practices in economic entomology and mycology will be found in the new edition of the HORTICULTURIST'S RULE-BOOK.

†Bull 82. New Jersey Exp. Sta. 38.

‡Bull. 33, Cornell Exp. Sta.

Nematodes.

Increased attention has been given to injuries from the nematodes, which are true worms allied to the pork trichina, and they are found to cause very extensive and promiscuous injuries. They are found to be common in the greenhouses of the north, as well as in the open in the southern States, causing the formation of root-galls upon a variety of plants. They are often very serious pests in house-grown tomatoes. The nematodes also attack the leaves of some plants,* as bouvardia, pelargonium, cineraria, begonia, cyclamen, lily, coleus, and others. In Europe the injuries from nematodes are so great that an experiment station has been established at Halle, Germany, for the purpose of investigating the subject.†

Introduction of predaceous insects.

The introduction of the lady-bird predacean (*Vedalia cardinalis*), from Australia to California, to destroy the orange-scale, still remains one of the wonders of economic entomology.‡ The scale has been almost completely destroyed in many localities, and the orange industry has been given a new impulse. In fact, so great has been the benefit of the vedalia colonization, that the last legislature of California appropriated $5,000 "for the purpose of sending an expert to Australia, New Zealand, and adjacent countries, to collect and import into this State parasites and predaceous insects." This fund was placed in the hands of the State Board of Horticulture, and Albert Koebele has been dispatched to Australia to look for new insect friends. Mr. Koebele has already sent several promising predaceans to California from the Sandwich Islands and from Australia. He reports the finding in Australia of important enemies of the serious red scale, and they have been sent to America. These predaceans are mostly

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*See "Eel-worms in Leaves of Cultivated Plants," by B. D. Halsted in *American Garden*, xii. 410 (July, 1891). Also Atkinson, Insect Life, iv. 31.

†See Jahresbericht der Versuchstation für Nematoden—Vertilgung, by Dr. M. Hollrung, 1890.

‡For an account of the introduction, see ANNALS for 1889, 62. Also, ANNALS for 1890, 103.

lady-bugs, the two leading species being *Orcus chalybeus* and *O. Australasiæ.* Mr. Koebele is also introducing American insects into the countries he visits.

Predaceous insects.

The signal success of the importation of vedalia has led to several other efforts in similar directions, but so far apparently without marked success, because of the loss of the insects upon the voyage. Attempts are being made to carry the vedalia to Egypt and South Africa, and efforts have been made to scatter the parasites of the codlin-moth and Hessian fly.* All these methods are earnests of a new method of dealing with injurious insects, and one which promises great results.

The phylloxera in Europe.

The grape phylloxera† still continues to spread, particularly in Europe, and it threatens the destruction of the grape industry in many of the most famous grape regions of the world. The following account of the distribution of phylloxera in Europe and adjacent Asia, is compiled by M. Battanchon from figures obtained in 1890 and 1891, and published in the journal *La Vigne Americaine :*

"Spain. According to the latest accounts, the work of the phylloxera is terrible in Spain, the want of protective measures making the injury much more severe than it otherwise would be. In each province there is a vigilance committee. An expert, acting under the orders of the committee, is supposed to examine infected vineyards ; this service is under the direction of a higher central committee, which is located at Madrid. Unfortunately, the service is very poor, for the funds are very limited and the work of the committee amounts to almost nothing.

"In the province of Malaga, which was one of the first invaded, it was impossible to save more than a few of the old vineyards, and these are still bearing. Not a sufficient number of American vines have yet been grafted to make the crop yielded by them of much importance.

"The province of Grenada has been known to be infested with phylloxera since 1886. To-day the applications of the bisulphide of carbon are abandoned ; it is the same with submersion, which causes chlorosis in the healthy vines. Pulling up the vines and planting new vineyards are the only treatments given at present. If, in leaving Grenada, one follows the shores of the Mediterranean Sea, where the vineyards are situated upon the high mountains of Alpujarra, the course of the scourge can be seen extending into the province of Almeria, and also menacing Murcia, the borders of which are already in contact with the completely infested province of Alicante.

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*For an account of the importation of the Hessian fly parasites, see Insect Life, iv. 179.

†For an extended discussion of the phylloxera, see ANNALS for 1890, 98-103.

The phylloxera in Europe.

"In 1886 the phylloxera was allowed to reach the hills of Barcelona, where the border of this province joins that of Gerona. In 1887 and 1888 the disease reached the confines of Tarragona, which was already attacked. The insect followed the direction of the prevailing wind, which was from east to west, and to-day has reached the province of Saragossa, where large portions of extensive vineyards are already affected. In conclusion, it may be said that all cf Catalonia has been infested, or is about to be so. In the single province of Gerona it is estimated that 26,516 hectares* have been ruined, and 439 in Tarragona. This makes about 30,000 hectares of this region entirely unproductive. And still the disease will spread, in spite of the precautions which may be taken.

"In 1888 the vast zone comprising the provinces of Salamanca, Zamora, Leon, Orense, and Pontevedra, had suffered but little. To-day all this district is infested, Orense particularly. This province was attacked from Tras os Montes, on the frontier of Portugal.

"According to official Spanish statistics, about 137,332 hectares are infested in Spain, and the decrease in wine production is estimated at over two million hectolitres,† valued at about 31 million francs.

"Portugal. The phylloxera is probably advancing more rapidly and doing more damage in the vineyards of Portugal than anywhere else in Europe. Especially in the northern part of the country, the ravages of the insect are almost incredible. The inspector affirms that it will not be long before every vine will be diseased. Out of 151 communes, 91 are infested, and these are just the ones in which the richest and most profitable vineyards are situated. In northern Portugal, and in eleven districts, 100,000 hectares have been invaded, and upon 36,000 of these the vineyards have been entirely destroyed. 32,000 hectares out of 50,000 have been ruined in the Douro region. The present injury must be considerably greater, as these numbers refer to 1889. Minho, also attacked, sees its revenue reduced year by year. The situation in Bairrada is about the same. New places of infection are also reported in the southern vineyards of Alemtejo. There, as in Spain, the precautions taken are insufficient ; the vineyards are renewed but slowly, although some growers are planting extensively, and with success.

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* A hectare is 2.47 acres.

†A hectolitre is 26.4 gallons.

"Italy. The actual area over which the vineyards are attacked by phylloxera in Italy is about 40,000 hectares, and the area threatened is about 200,000 hectares. Tuscany is badly infested, as is also the island of Elba. Southern Italy is not in the best condition. The pest gradually spread from Calabria, where it first gained a foothold, into all the neighboring provinces. In the province of Lecce, and in all eastern Italy, the insect spread quite rapidly on account of the trifling distances between the vineyards.

The phylloxera in Europe.

"An eighth part of all the vineyards of Sicily, covering about 212,000 hectares, were infested at the end of 1889 ; since then the disease has spread from one locality to another, and all the efforts of the Sicilian growers to check its progress have been in vain.

"In Sardinia the insect has spread throughout the entire province of Sassari, and it now commences to invade Cagliari.

"Austro-Hungary. In 1889 the phylloxera had invaded 61 communes in Lower Austria, 39 in Styria, and 29 in Carinthia. In Hungary, more than 1,300 communes, representing over 40 departments, were diseased. At present it is estimated that 17 per cent. of the vineyards of Austro-Hungary have been destroyed by the phylloxera, and that sixty-three per cent. are badly affected, thus leaving only 20 per cent. which are considered as healthy. It must be said that during the past few years the insect has spread remarkably fast, seeming to advance more rapidly in loose gravelly soils. In all these localities preventive measures have given only partially satisfactory results. Here, also, the American stocks are coming into use. Large quantities are being cultivated in the state nurseries and in the various departments. The only countries of the empire which are still free from attack, are

Dalmatia, Tyrol, and Vorarlberg; the insect has been discovered recently in some communes of Carniola. In Istria, 58 hectares were infested in 1884; to-day there are about 85, which border on the infested districts of Goritz.

"About 250 hectares have been set out to American vines in Hungary. Beside the rooted plants furnished by the state nurseries, over one half million have been imported from southern France. The planting of vines in the sandy soils continues to increase; and these lands, which were formerly barren, seem destined to assume the place of those upon which the phylloxera has destroyed so many valuable vineyards.

"Germany. The phylloxera has been discovered in the vineyards of the Rhine, at Rudesheim and at Gorshausen, and it is feared that it will spread to the north of Bingen, and south beyond Mayence. Already 18 newly infested districts have been discovered upon the left bank of the Rhine, and 28 upon the right bank. In Saxony, the Loessnitz district is entirely devastated. It is hoped that 900 hectares may be saved, because they are situated some distance from diseased localities. In Wurtemburg, also, many vineyards have been attacked.

The phylloxera in Europe.

"Switzerland. The phylloxera has done much damage ever since its first appearance. Recently a new point of attack has been discovered in the canton of Vaud. In the vineyards of Neufchatel the number of infested districts has been doubled since 1888. December 21, 1889, they numbered 785, and included 9,738 diseased vines. All the communes in the canton of Geneva, except five or six in the neighborhood of Jussy, are more or less infested. The viticultural station at Haut-Ruth, near Geneva, has been supplied with many American vines. Most of the cuttings, and also the grafted stocks, were received from the department at Hérault. About 151 infested localities have been discovered in the canton of Zurich, and several million vines have already been destroyed.

"Russia. The pest is at present doing much damage in the vineyards about Tiflis. The importation of vines from the Caucasus has recently been prohibited by a decree. It is a serious menace to Russian viticulture, for the industry has quite rapidly extended into Caucasia, Transcaucasia, and into

Bessarabia and Crimea. Bessarabia is already badly infested, and active measures are being taken to destroy the pest.

"Bulgaria, Servia and Roumania. The phylloxera is present in the districts of Widdin and Koula only, although no protective measures have been adopted. No accurate information in regard to the increase of diseased districts can be obtained.

The phylloxera in Europe.

"Greece. The presence of the phylloxera in Greece has not yet been officially announced.

"Turkey. Since 1885, when the commission conceded the presence of the phylloxera in Turkey, no official investigation has been carried on to determine the amount of damage done by the insect. But recent information shows that the district of Aïdin has been invaded, and this region is the most important, so far as viticulture is concerned, of any in Turkey.

"Over 10,000 hectares of vineyards in Asia Minor are now infested. The beautiful vineyards of Smyrna are partially ruined, and on account of the carelessness of the government, it is feared that all the vineyards in the Ottoman empire will soon be infested."

Spraying-machinery.

In spraying-machinery, there has been great activity in the manufacture of various styles of knapsack pumps, and several horse-machines have been put upon the market or have received marked improvements. The most important departure of the year, however, is the labor of the committee appointed by the Association of Agricultural Colleges and Experiment Stations, to consider means by which uniform sizes of fittings can be secured for all spraying-machines. This committee, appointed in November, 1890, consists of W. B. Alwood, of Virginia, D. G. Fairchild, of Washington, D. C., and James Troop, of Indiana. It has secured the agreement of nearly all manufacturers to use standard sizes of threads and other fittings, and the advantages of its labors will be placed before the public for the season of 1892.

In the treatment of plant-diseases, the copper-sprays continue to gain favor, and their use for control of diseases of the grape has already come to be an established practice among growers. It is a question of but two or three years before the leaf-blight of quinces and pears, apple and pear-scab, and the old potato-rot, will come under the control of the general grower. There is a distinct movement in favor of the ammoniacal carbonate of copper, as compared with the Bordeaux mixture, as it is cleaner, cheaper, and much more easily used. Among new fungicides, there are two which demand record here. The more important is that prepared by the Division of Vegetable Pathology of the National Department of Agriculture last year, as "Mixture No. 5." It consists of equal parts of ammoniated sulphate of copper and carbonate of ammonia, thoroughly mixed and put up in air-tight cans. A pound of this dry mixture is used to 30 to 50 gallons of water. The material is cheap, costing about 45 cents per pound, is easily prepared, and can be kept in the dry state until desired for use. This material, which is essentially a dry eau celeste, has been used with good results upon those fungi for which the ammoniacal carbonate of copper and Bordeaux mixture are employed. Lodeman* has found that the chloride of copper possesses merits which entitle it to trial for the common plant-diseases. When used at the rate of three ounces in 22 gallons of water, it gave better results upon squash mildew (*Odium erysiphoides* var. *Cucurbitarum*) than did the Bordeaux mixture.

Fungicides.

Little progress appears to have been made this year in securing any satisfactory new combination of insecticide and fungicide. In 1890, Gillette† found that the addition of lime to London purple renders the arsenic harmless to foliage, a fact which led to the combination of the arsenites and Bordeaux mixture with good results. But when the ammoniacal carbonate of copper and the arsenites are combined, arsenic is dissolved by the ammonia, and the compound becomes very caustic to foliage. Lodeman,‡ who has investigated this subject at length during the year, finds that the caustic action of arsenites is increased, not only by the ammoniacal carbonate of copper, but by the addition of other salts of copper, as the sulphate, hydrate, borate and chloride. The insecticidal and fungicidal values of the substances remain, however, after the combination is made. Weed,§ however, recommends a combination of arsenites and carbonate of copper, to which

Insecto-fungicides.

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* Bull. 35, Cornell Exp. Sta. (Dec. 1891).
† ANNALS for 1890, 94.
‡ Loc. cit.
§ Spraying Crops, 32.

lime is added to render the arsenic insoluble. No evidence is given that this combination is always safe and effective, and there are chemical reasons for doubting its value ; and it may also be said that the addition of lime is what we desire to avoid, for it is the lime in the Bordeaux-arsenite combination which renders the material thick and heavy, and makes it nearly valueless for large trees.

A new insecto-fungicide.

Washburn* has made a combination insecticide and fungicide upon a new principle. It is a mixture of Paris green, sulphide of soda, and whale-oil soap :

a { Whale-oil soap, 10 ℔s.
Water, 20 gals.

b { American concentrated lye, 1 ℔.
Sulphur, 2 ℔s.
Water, 1 gal.

"When *a* is heated enough to become thoroughly liquid, and *b* has been boiled until it is thoroughly mixed and dark brown, add *b* to *a*; then heat for half an hour and add 30 gallons of water, and use at a temperature of 120 degrees Fahrenheit."

c Paris green at the rate of 1 ℔. to 300 gallons.

This combination was found to lessen apple-scab, codlin-moth injuries, and the woolly aphis.

Mycological prognostication.

A phase of the study of plant-diseases which demands attention, is what may be termed mycological prognostication. It is quite as important in many cases to know what are the probabilities that a certain disease will attack a crop, as to know the direct means of combating it. The conditions of weather and other environments which influence the spread of plant-diseases should receive close study. When, in 1890, the apple-scab was so bad in New York, growers everywhere asked what were the probabilities of an attack in 1891. No one could answer. But the crop of 1891 was the fairest which has been grown in many years.

The "grape scare."

One of the curious circumstances of the year was the "grape-scare" in New York city. The city board of health seized a small consignment of grapes from Ulster county, New York, which was discolored by Bordeaux mixture. The fact was given to the press, and the most exaggerated reports were circulated, stating that most of the grapes in the market were unwholesome. An investigation was made by the Department of Agriculture, and it was found that the alarm came entirely from the grapes of a very few growers, who were careless in the use of the fungicide. The season was dry, and the spraying had been continued longer than necessary ; and the growers had not exercised proper care in sorting the grapes for market. The board of health was also precipitate in its action. The board, after an investigation, made the following statement, which was given to the press :

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*Bull. 10, Oregon Exp. Sta. (April, 1891).

"1. A copper salt is found only upon a very small part of the grapes offered for sale, and the grapes which are to be avoided are easily recognized by the greenish-colored substance upon the berries and stems.

The "grape scare."

"2. Whenever the substance is apparent upon the berries or stems, the grapes should be washed before they are used as food or in the manufacture of wine.

"3. The board urges all dealers and consignees in this city to advise shippers and consignors of grapes to send no more grapes to this market upon which this substance is apparent. The board further states that it does not object to the use of Bordeaux mixture as recommended by proper authorities ; but such mixture, or any mixture containing poisonous substances, should not be sprayed or otherwise placed upon the grapes immediately before or after they have matured, and should not appear upon them when sent to the market or offered for sale."

Peach-yellows.

The peach-yellows continues to make serious inroads upon the peach industry in many parts of the country. Dr. E. F. Smith, our best authority upon the disease, speaks of it as follows in his last bulletin :* "Peach-yellows is a perplexing and destructive disease. On all hands it is conceded to be one of the most serious with which American fruit-growers have to contend. Formerly this disease was confined to a small district on the Atlantic coast ; but during the last twenty years it has invaded distant regions hitherto free, and has entirely ruined the peach industry over very considerable areas. Within ten years the disease has taken a fresh and very strong hold upon orchards in the Delaware and Chesapeake region, the north portion of the peninsula, and has destroyed thousands and thousands of trees, rendering a great industry unprofitable or precarious. It seems to be native to the eastern United States, having, so far as we know, not been reported from California. Diligent inquiry, also, has thus far failed to bring to light any notice of its occurrence in Europe or other parts of the globe." Dr. Smith has established by rigid scientific tests what has been strenuously held by the most observant growers, that the yellows is not due to any peculiarity or defect in the soil, and that the disease is communicable. His latest conclusions concerning its communicability are as follows: The disease is contagious; it may be conveyed by seemingly healthy buds taken from diseased trees; only a very small portion of infective material is necessary to convey the disease from tree to tree; the disease has a long period of incubation. The following propositions, while not succinctly proved, appear to be well-founded: The whole tree is affected when symptoms appear in any part of it; the disease is communicated in some other way than by bud-inoculation; trees are not infected through the blossoms. Everything points to some micro-organism as the cause of the disease. But whatever may be the cause, strenuous legislation, rigidly enforced, must be relied upon to rid the country of the disease.

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*Bull. 1, Division Veg. Path. U. S. Dept., Agric. 11 (1891).

Peach-yellows.

The peach-rosette is a disease first separated and characterized by Dr. Smith, and his latest report* shows that it is contagious and serious. It appears to be confined to Georgia, and is most abundant on the archæan formations. It is allied to yellows, but differs in the following points: The more tufted character and somewhat different appearance of the diseased growths; the much greater tendency of these compactly tufted growths to develop in early spring from winter buds, and to appear all over the tree; a less tendency to develop sprouts upon the trunk and main limbs; the absence of premature fruit; the general early fall of leaves and fruit on affected trees; the fruit being small, yellowish green, and more or less shriveled and gummy; gummosis of the roots; the occurrence of the disease in plums; the much more speedy destruction of affected trees. It is probable that radical measures would obliterate the disease if applied before it spreads further.

Peach-rosette.

The potato-blight or rot has been very abundant over a large part of the United States and Canada for four or five years, and much attention has been given to its treatment. There are two distinct potato-blights in the country, both of which also cause the tubers to rot. One is a true fungous disease (due to *Phytophthora infestans*), and the other is bacterial. The former is the old or true potato-rot. The relative frequency of these two diseases throughout the country has not been determined, but it is certain that much of the injury to potatoes is due to the little-known bacterial disease. Fortunately, the ammoniacal carbonate of copper and Bordeaux mixture are specific preventives of the old or true potato-rot, if applied early and persistently. In Europe many experiments have been made to determine the best means of keeping the disease in check. An extended experiment was conducted in Belgium and Holland in 1890 by E. Thienpont, the results of which were published this year.* An abstract of the investigation is here given :

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*Bull. 1, Division Veg. Path. U. S. Dept. Agric. 45.

Potato-rot.

"More than forty men carried on experiments in treating potato-foliage with the Bordeaux mixture as a protection against the potato-rot. Ninety-five experiments were made, and the plants were necessarily grown under widely different conditions. The land upon which the potatoes were grown was of all kinds, from sand to heavy clay. About forty varieties of potatoes were grown, some of which were very early and others late. The only fungicide used was the Bordeaux mixture, and this was made with varying amounts of the sulphate of copper. Most of the planters made two applications only ; but some made only one, and others three.

"Among these experiments there are only six in which no difference between the treated and untreated plats could be seen. No reason for this can be given, as there is a difference in the varieties grown, strength of mixture, number of applications, etc. But in other cases, apparently the same conditions gave excellent results. There were six plats which gave unsatisfactory results ; 49 in which the gain was highly profitable, and 34 in which complete success was reported. These 95 results are on the whole conclusive ; but if all elements of error should be removed, such as imperfectly made fungicides, wrong times and methods of application, etc., the final result would probably show an astonishing degree of success. The author fully realizes the difficulty of drawing

Potato-rot in Europe.

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*Le Traitement de la Maladie de la Pomme de Terre. Brussels.

conclusions from results which have been obtained upon different soils, with different varieties which were planted at different times, and were treated with different kinds of manures. Each case requires individual study, for all circumstances must be taken into account.

"It is scarcely necessary to mention the great susceptibility to rot of some varieties, as Lilloise, for example, and how much the danger is increased by late planting, or by the use of strongly nitrogenous fertilizers. The severity of the disease also varies with the character of the soil, those of a lighter character being more free from the disease, the heavy clay soils being most subject to attack; but even upon the sandy soils the disease is often severe. This is usually due to the fact that they are moist, or that the dews are heavy; for under such circumstances the spores of the fungus germinate rapidly. Shallow, sandy soils, which have a subsoil impervious to water, lose most of their immunity from attack. If complete successes can be cited in spite of all these unfavorable circumstances, the variety of potato, nature of the soil, and continuous rains, I think it will be impossible to attribute them to any other cause than the applications of the fungicide.

Potato-rot in Europe.

"Following are the figures regarding the Lilloise potato, which is everywhere grown, and is considered of best quality. The name of the grower is given in each case:

Mr. Van Wildermeersch, of Bavichove. Soil good, two applications, June 15 and July 1.................Gain 8,000 kilgr.* per hect.†
Mr. Jacquart, of Dottignies. Soil clayey; two applications, June 30 and July 14................Gain 7,000 to 8,000 " "
Mr. Dooreman, of Burst. Soil heavy clay; three applications, June 23 and July 9 and 28...........Gain 8,287 " "
Mr. Landrieu, of Heurne. Soil, clay and sand; two applications, at end of June and middle of July. Gain 8,700... " "

If we consider the different varieties, both old and new, the results are about the same, as is shown by the following:

Mr. Van Wildermeersch. Variety, Tonneliers; two applications, June 15 and July 1...................Gain 9,000 kilgr. per hect.
Mr. Vercampt, of Beveren. Soil, clay and sand; variety, Early Dunes, two applications, June 1 and July 14...Gain 8,000 " "

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*A kilogram is 2.2 pounds.

†A hectare is 2.47 acres.

Mr. Jacquart. Soil clayey ; varieties, Semis de Bevere, Juno and Rouge ; two applications for two varieties, and three for the other. June 30, July 14 and 29. Gain 7,000 to 8,000 kilgr.* per hect.†

Mr. Brutsaert, of Watou. Soil clayey ; variety, Rykmaker's. Late ; three applications, July 14 and 29, August 16.. Gain 10,343 " "

Mr. Planque, of Wervicq. Soil, sand and clay ; varieties various ; three applications, July 9–12 and 25–28, August 18–21...........................Gain 3,000 to 11,200 " "

Mr. Knook, of Oud-Vosmeer. Soil clayey; variety, Bleue de Zélande; two applications, July 9 and 18. Gain 8,662 " "

Potato-rot in Europe.

"In the experiments conducted by the author, the superiority of certain treatments was apparent, according to the times when the applications were made. I had two separate fields, one of which was neglected. The first application was made June 23 ; the second was delayed until July 21. Here and there certain pale spots appeared on the foliage, but no attention was paid to them. At the beginning of August the injury spread so rapidly that, with the exception of a few squares, a third application was entirely impracticable. The yield of the treated and untreated rows, although considerably different, was nevertheless poor. The other part, which was planted with three early but susceptible varieties, was sprayed June 4, 17 and 26, and one are‡ which was planted with Blanche de Schelderode by mistake, was sprayed June 4 and 26, and also July 21. All gave splendid results. The maximum number of diseased tubers was not over two per cent.

"There can be no doubt that these results are due to the fact that the mixture was applied before the spores of the fungus had germinated, and that the applications were repeated before the fungicide already applied was washed from the foliage. It is only a preventive method of treatment that gives complete results. This has been proved again and again. The progress of the disease can be checked only by the aid of climatic conditions, for the experiments have shown that late applications were of little practical value.

"Mr. Proost, the Minister of Agriculture, recommends the use of 4.4 pounds of the sulphate of copper, and 3.3 pounds of lime in preparing the Bordeaux mixture. Several growers adopted this formula, but I used only 3.3 pounds of the sulphate. Three varieties of potatoes were used, and each variety was grown on four plats, three of which were treated with the Bordeaux mixture made with 6.6, 3.3, and 2.2 pounds of copper sulphate, lime 3.3 pounds, water 26 gallons. The best results were obtained from the plats treated with the mixture which contained 3.3 pounds of the sulphate, and I believe that equally good results may be obtained with 2.2 pounds if the applications are made early enough and repeated every two or three weeks. Whatever the amount of the sulphate used, if the lime is good only one-third as much by weight need be used as is taken of the sulphate. An excess of the lime makes the mixture less adhesive.

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*A kilogram is 2.2 pounds.

†A hectare is 2.47 acres.

‡An are is about one-fortieth of an acre.

Potato-rot in Europe.

"The Early Violet potato is so susceptible to the disease that formerly I lost all my plants at least once each year for three years in succession. This year, in spite of the continuous rains, I did not find one diseased potato when they were dug, which was on the 1st of August. Another examination was made in November, and only nine diseased potatoes were found, and these were only slightly injured. This was only two per cent. of the total yield. The same is also true of Royal Ash-Leaved and Wonderful or Kidney. A treated plat of White Schelderode yielded 29,413 kilograms, while an untreated plat of the same size, and adjoining the first, yielded only 17,842 kilograms. The number of diseased tubers on the first plat was 180 kilograms against 7,646 in the untreated plat. These figures should convince every one of the value of spraying to prevent the rot of potatoes. But more, by finding the average gain per hectare of the 71 experiments, we find that it is 4,970 kilograms, or 73.7 bushels per acre. In calculating this average, the total failures are included as well as a large number of highly susceptible varieties.

"In Belgium the disease usually makes its appearance early in July. Since it requires some days for the disease to progress far enough to become visible, it is evident that applications should be made earlier, from the 15th to the 25th of June. For very early varieties which are planted late in March, the operation may be performed from 10 to 15 days earlier. The second application should be made in about 18 days, and during rainy weather it should not be delayed more than two weeks. Ordinarily two applications are sufficient both for early and late varieties, but it is sometimes necessary to make one to two more. Probably the best time to make the applications is on a still, sunny day. The liquid can be more uniformly distributed when no wind is blowing, and if it dries soon after being applied, the lime and copper adhere very firmly to the leaves.

"The quantity of the Bordeaux mixture to apply to a hectare cannot be definitely stated, for it varies with the variety of potato grown, with the amount of leaf-surface, the method of cultivation, etc. Counting 55,000 plants to a hectare, from six to eight hectolitres* are necessary for the first application, and from ten to twelve for the later ones.

"Most of the substances which are used against fungi are also recommended, but those containing copper are probably the best. The value of powders is doubtful, for they are harder to apply and their action is not so certain.

Treatment of potato-rot.

"Conclusions.—1. The Bordeaux mixture which contains 3.3 pounds of copper sulphate and 1.1 pounds of lime, is as efficient as that containing 4.4 or 6.6 pounds. It is even probable that 2.2 pounds of the sulphate is sufficient.

"2. The treatment, so far as possible, should be preventive.

"3. The probabilities that a curative treatment will be successful are only slight, unless the disease is also checked by some natural causes, such as a north wind, prolonged draught, or the absence of dew.

"4. The first application should be made 8 to 10 weeks after planting, and the following ones at intervals of 18 to 20 days. But during a rainy season the applications should be repeated about every two weeks, and for late varieties, at least three should be made to save any considerable portion of the crop.

"5. From 6 to 8 hectolitres per hectare are required for the first application; the later ones require from 10 to 12.

"6. The yield of tubers from varieties which are said to be free from attack is markedly increased by applications of the Bordeaux mixture.

"7. Most fungicides are effective in the treatment of the potato crop, and the copper compounds are particularly valuable in this respect."

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*A hectolitre is 26.41 gallons.

Bacterial potato-rot.

The bacterial disease or blight of potatoes is more serious than the old or true rot, because there is no known method of treating it. The most that can be done at present is to practice rotation of crops. The same disease, apparently, attacks tomatoes, and probably some other plants. Much attention is now given to bacterial diseases, and they have been observed in many plants, as in various cucurbits, egg-plant, sweet-potato, potato, tomato, and others. The bacterial blight of the pear has received attention during the year by the Department of Agriculture, and results of economic importance will soon be published. Bacterial or germ diseases are obscure and serious, and the treatment of them must always be to a great extent strategic. Our increasing knowledge of them enforces another reason for the rotation of crops; and the rotations of the future must alternate immune crops with the others. There is indication that in some departments of husbandry these invisible foes will compel us to overturn our present managements.

§ 4. *National and Educational Interests.*

The year has been an eventful one in general discussions of horticultural interest. Perhaps the most general attention has been attracted to the preparations for an horticultural exhibit at the Columbian Exposition, particularly to the proposed schedules or classifications of horticultural industries. This discussion of schedules has been of the greatest importance, since it has necessarily resolved itself into a debate as to what horticulture really is. The discussion has revealed the fact that there still exist the vaguest notions as to the legitimate province of the subject. Etymologically, horticulture means the cultivation of a garden (*hortus*, garden, *cultura*, cultivation); and as all intelligent cultivation rests upon many scientific principles, both the art and science of garden cultivation should be included in the definition. The scope of the definition turns upon the meaning of the word garden. This word comes directly from the Anglo-Saxon *gyrdan*, to enclose, and is allied to the verb *to gird;* and indirectly it is allied to the Latin *hortus*, which originally related to an enclosure. Garden-culture or horticulture has always been used in distinction to the cultivation of extensive tracts, many of which, in former times, were not enclosed, or were indefinite in outline or extent. The enclosed area may have been many acres in extent, and yet have been called a *hortus* or a garden. The Latins sometimes used the word *hortus* for a villa or a country-seat;* and in England, to-day, the word garden has a wide application, being applied to large lawns and pleasure-grounds, as well as to small enclosures, and in this sense the

What is horticulture?

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*The following note upon the original use of *hortus* is given me by my colleague, Professor W. G. Hale: "I find that *hortus* is nowhere used in classical Latin in the sense of villa. But Cicero, Varro and Festus mention that among the (to them) ancients it had that sense. In the fragments of the Laws of the Twelve Tables (450 B. C.) it is so used. Latin literature proper, however, does not begin till two centuries later, and in this literature, *hortus* means only a small cultivated garden."

word is used in landscape-gardening. In America the word is commonly restricted to a comparatively small area which is used for the close cultivation of flowers and kitchen-garden vegetables; but this use of it is erroneous and without warrant. Gardening and horticulture are synonymous terms.

The exact meaning of the word horticulture, however, must be determined by its general application. Lindley defines it as "that branch of knowledge which relates to the cultivation, multiplication, and amelioration of the vegetable kingdom." It appears never to have been understood in this broad sense, however; for this definition includes all the cereals and forage-plants, which have always been regarded as the particular property of general agriculture. The best understanding of the term is to be derived from its use in journals, societies, schools and experiment stations, and it is gratifying to know that it has always been used by these institutions in one sense—to include the arts and sciences which immediately underlie the cultivation of fruits, kitchen-garden vegetables, flowers and other ornamental plants. These are the fields which all professors of horticulture are understood to cover, and which all general horticultural journals include.

Scope of horticulture.

It may happen, however, that plants which in some countries fall to the care of the horticulturist, may in others be the property of the farm rather than the garden; and so it comes that, while the general definition of horticulture may be easily drawn, there are many conflicts in the details, and the lines must be arbitrary in some cases. This fact is well illustrated in the case of potatoes in America. The Irish or round potato is held by both horticulturists and agriculturists, although the index of experiment station literature preparing by the Office of Experiment Stations places it—and rightly, I think—under agriculture; but the sweet-potato has always fallen to horticulture, although it would be difficult upon any other than arbitrary grounds, sanctioned by custom, to retain it there.

Horticulture, then, readily separates itself into three great divisions—fruits, vegetables, and flowers; and there is also a fourth division of it which relates to the care and cultivation of ornamental plants in their relation to landscape, and which has been called landscape-horticulture. Landscape-gardening, itself, is a fine art, and is not, therefore, strictly speaking, a part of horticulture ; but it requires an intimate knowledge of horticulture for its best prosecution, in the same way that architecture demands a knowledge of carpentry and kindred arts. Yet the ultimate principles of landscape-gardening are distinct from those of cultivation and propagation of plants and all the mere technicalities of making a sod and of planting; and it is by no means inconceivable that a man may possess taste and tact sufficient to lay out grounds, and yet have very little horticultural knowledge. And the term landscape-horticulture is further of special importance in emphasizing the fact that landscape-gardening is more than the mere embellishment of a bit of ground, or the clever arrangement or training of plants. Objection has been raised to the term upon the ground that the ideal landscape-gardener should be also a horticulturist, and that no hard and fast lines can be drawn between landscape-gardening and horticulture ;* but although these statements are incontrovertible, it is still true that while much that is called landscape-gardening is horticulture, there is also much of it which is not, and the term landscape-horticulture rests, therefore, upon a real distinction. But it should be said that it is not the office of the term to force any division in the practice of landscape-gardening, but simply to record a distinction which it is often useful to recognize.

Landscape-horticulture.

Horticulture, then, may be defined as the art and science of the cultivation of garden plants ; and the garden is understood to be that part of an estate which is devoted to fruits, vegetables and ornamental plants, in distinction to those areas used for cereals or general field crops, forage-plants, the care of domestic animals, and forestry. The following outline, while by no means complete, will indicate the scope of horticulture as understood in America :

Definition of horticulture.

GROUP I. POMOLOGY, OR THE ART AND SCIENCE OF GROWING FRUIT.

I. Viticulture.
II. Orchard culture.
  A. *Pomaceous Fruits.*
    Apple.
    Pear.
    Quince.

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*Garden and Forest. i 51.

B. *Drupaceous or Stone Fruits.*
- Plum.
- Cherry.
- Peach and Nectarine.
- Apricot.
- Almond.

C. *Citrus Fruits.*
- Orange.
- Lemon.
- Lime.
- Citron.
- Shaddock.

D. *Nut-Fruits.* (*Nuciculture.*)
- Walnut.
- Butternut.
- Pecan.
- Hickory.
- Chestnut.
- Filbert and Hazel.

E. *Palmaceous Fruits.*
- Cocoa-nut.
- Date.

III. Small-fruit culture.
- Strawberry.
- Raspberry.
- Blackberry.
- Dewberry.
- Currant.
- Gooseberry
- Juneberry, and others.

IV. Cranberry culture.

GROUP II. OLERICULTURE, OR THE ART AND SCIENCE OF GROWING KITCHEN-GARDEN VEGETABLES.

A. *Radicaceous Esculents.*
- Sweet-Potato.
- Horse-Radish.
- Radish.
- Parsnip.
- Carrot.
- Salsify and Scorzonera.
- Turnip.
- Beet.*

B. *Brassicaceous Esculents.*
- Cabbage and Kale. (Borecole or Kale. Brussels Sprouts. Cabbage.)
- Cauliflower and Broccoli.
- Kohl-rabi.

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*Mangel-Wurzels, being grown for stock, and Sugar-Beets, belong to agriculture.

C. *Alliaceous Esculents.*
    - Onion.
    - Leek.
    - Garlic, Chives, etc.

D. *Spinaceous and Acetariaceous* (*Salad*) *Esculents.*
    - Spinage.
    - Other spinaceous plants — Rhubarb, Chard, Orach, Sorrel, Dock, Purslane.
    - Lettuce.
    - Endive.
    - Celery.
    - Cress and Mustard.

E. *Asparagaceous Esculents.*
    - Asparagus.
    - Artichoke, Cardoon, Chicory.
    - Sea-Kale.

F. *Leguminaceous Esculents.*
    - Pea.
    - Bean.

G. *Cucurbitaceous Esculents.*
    - Cucumber.
    - Melon,—Muskmelon, Watermelon, Citron.
    - Squash and Pumpkin.

H. *Solanaceous Esculents.*
    - Tomato.
    - Egg-Plant.
    - Red Pepper.
    - Physalis or Husk Tomato.

I. *Aromatic Esculents and Sweet Herbs.*

J. *Cryptogamic Esculents.*
    - Mushroom.

GROUP III. FLORICULTURE, OR THE ART AND SCIENCE OF CULTIVATING ORNAMENTAL PLANTS FOR THEIR INDIVIDUAL USES.

It is impossible to present any synopsis of floriculture which shall be generally useful, for its subdivisions rest largely upon the objects for which the plants are grown. Perhaps the most serviceable classification would be one which should simply group the plants into their natural orders or families.

GROUP IV. LANDSCAPE-HORTICULTURE, OR THE ART AND SCIENCE OF GROWING ORNAMENTAL PLANTS, ESPECIALLY SHRUBS AND TREES, FOR THEIR USES IN THE LANDSCAPE.

This passes insensibly into landscape-gardening itself. It is interesting to note that Shenstone, the author of the term landscape (or landskip)-gardening, distinguished it from mere ornamental or "parterre-gardening": "Gardening may be divided into three species—kitchen-gardening, parterre-gardening, and landskip, or picturesque gardening."*

The nursery business belongs to horticulture, and is that part of the cultivation of the various species which relates to the propagation or rearing of plants. In America the word nursery is usually associated with the rearing of woody plants alone; but this limitation is erroneous. Seed-growing is also a part of horticulture which is or may be associated with all plants. Mere manufacture, however, is not horticulture, as the making of wine, cider, jellies, extracts, and canned goods. Horticulture ends at the factory door.

World's Fair.

The Columbian Exposition promises to offer great opportunities for the study of American horticulture ; but there appears to be no definite movement looking towards an international horticultural congress, although the necessity of such a conclave has been urged by the press. The following general outline of the plan of the horticultural exhibition was read before the Michigan Horticultural Society, in December, by J. M. Samuels, Chief of the Division of Horticulture :

"By persistent effort we have succeeded in having assigned to the department all of a beautiful elevated island, containing fifteen acres, and around which are clustered most of the great buildings of the Exposition. The view, from every part of this island, will be the grandest on the grounds, and in some respects will not be equaled in the world. Adjacent or near to the horticultural buildings an additional ten acres have been secured, making about twenty-five acres of outdoor space altogether. The island, upon which has been spread the black soil removed from all the building sites, mixed with a liberal supply of fertilizing material, will be used for an exhibit of roses, rhododendrons, azaleas, herbaceous plants, and a general nursery display. The planting immediately in front of the building will consist of echeverias and other bedding plants, arranged in raised beds and made to harmonize with the ornamental frieze which extends all along the front of the building. The beds will probably be illuminated with 30,000 or 40,000 incandescent electric lights, requiring 1,000 horse-power to operate them. And these lamps will show the complete outlines of every bed, and be placed under foliage, and colored in a way to bring out the most spectacular effects. They will be operated to show portions of the beds at one time, or different parts in rapid succession, and thus present an attractive panorama or kaleidoscope. Other parts of the outside grounds will be illuminated.

"The horticultural building is the finest ever erected for a fruit and plant exhibition. It is 1,000 feet long by an extreme width of 237 feet. It has a central glass dome, connected by front and rear curtains with two beautiful end pavilions, thus forming two interior courts, each 89 feet by 287 feet. The roof of the front curtains will be glass. They are intended for the tender plant exhibit. The rear curtains have opaque roofs, except sufficient glass to give an abundance of light for the fruit display. For heating the dome alone by steam, it will take ten miles of 1¼-inch pipe, besides an additional amount for the front curtains. There are 59,631 square feet more of floor space in the hall than in the combined horticultural buildings at the Centennial, New Orleans and Paris. The dome is 187 feet in diameter and 113 feet high on the inside, and to overcome the dwarfing effect on plants that would evidently be produced by its immensity, it is intended to construct a miniature mountain under its center, 40 feet high and 70 feet in diameter, and upon the sides and top of this artificial rock-work to set the largest specimens of palms, bamboos, tree-ferns, giant cacti, etc. Some grand examples, 40 feet in height, have been donated for this purpose. Among this mass of exquisite foliage will be represented, by the use of incandescent electric lights, the forms and tints, in colored glass, of flowers rarely seen in this country. Over its sides will fall in translucent sheets and ripples the water for a beautiful cascade, while the interior will form a cave, from the crystal side of which will be reflected the brilliant lights of thirty electric arc lamps of 2,000 candle-power each. In recesses, and for special effects, incandescent lights will be placed within the cave, in order to observe the effects and test the endurance of different species under such conditions. It is hoped to arrive at some definite and valuable conclusion by this experiment.

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*William Shenstone, Works, ii. 125 (176,).

World's Fair.

"In one of the courts of the building basins will be made for exhibiting *Victoria regia*, nymphæas, and other rare aquatic plants. Incandescent lamps will be arranged under the water to show effects not heretofore attempted. In the other court, California and Florida will compete for honors, with bearing orange-groves. The former state will illustrate the manner of irrigating their orchards, and the latter will intersperse bananas, pineapples, and other semi-tropical plants often cultivated in connection with the groves of that state. The balance of the building will be devoted to collections of orchids, crotons, cycads, deacænas, aroids, and rare plants from every part of the world, and to the fruit display.

"Space for at least 60,000 plates of fruit will be reserved for the grand display which will take place in September. In this exhibit, it is intended to keep out of the beaten paths of former expositions, and adopt some new methods. Long tables, with straight rows of fruit, are too monotonous, and will be avoided. It is intended to have the receptacles for the fruit made in artistic forms of papier-mache, and supported in unique ways. The exhibit will be embellished with flowers and plants, and made more attractive by miniature representations of orchards, methods of cultivating, irrigating, etc., in mountains and on plains, in tropical and temperate climates. Wax models of fruits out of season, and of those too tender to transport from distant lands will illustrate in form and color at least, specimens unfamiliar to most of the visitors who will attend the Exposition.

"Experiments will be made with glass cases, through which condensing refrigerator-pipes will be run, and the temperature kept at a proper degree to preserve, as long as possible, berries and other perishable fruits. The difficulty in the successful operation of this plan may be the condensation of moisture on the glass sufficient to obscure the view. It is said, however, that this can be obviated by making the glasses double, and leaving some space between them.

"In one of the pavilions the general seed and horticultural appliances display will take place ; in the other pavilion the viticultural exhibit will be confined. These will be separated from the other displays as completely as if they were in a separate building.

"The classification is very elaborate, and embraces almost everything of interest to horticulturists. Here may be seen fruits and plants from every part of the world ; the best methods of heating and ventilating greenhouses ; grafting, pruning, and spraying of trees and vines ; machinery for gathering and marketing fruits, and for assorting, cleaning, arranging, labeling, and testing the vitality of seeds.

"Mr. John Thorpe, of the floricultural bureau, is now in the east, and is instructed to visit every prominent conservatory and make a complete list of all the fine plants that will be donated, loaned, or exhibited for competition, with a view to having one or more men start, about the beginning of the year, to the West Indies and Central and South America, to collect large specimens that cannot be secured in this country. Directions for collecting, packing, and forwarding plants from foreign countries have been translated into several languages and widely distributed. Many intending exhibitors of fruits and plants, in this and foreign countries, have made application for space, or, with a view thereto, are corresponding with the department.

World's Fair.

"The management, with the aid of the heads of the other departments, has strenuously opposed all cash premiums, and it has therefore been more difficult to convince the authorities that an appropriation is necessary for this purpose. In my report to the committee on awards of the national commission and the agricultural committee of the local directory, I made the following statement : Believing that it will result in economy to the Exposition management, besides being an act of justice to a certain class of exhibitors, and also create a superior exhibit, I would recommend that an appropriation of $45,000 be devoted to cash premiums. No manufacturer of any horticultural appliance, or any person or corporation that could be greatly benefited from advertising a business, should receive a cash premium. On the other hand, the exhibitor of fruits and plants, who makes collections at great cost, pays freight and express charges, is protected by no patents, and receives no special benefit, and finally loses everything at the close of the Exposition, should be reimbursed for some of his outlay. As a prize that would be offered amounts to a very small per cent. of the value of the article exhibited, it seems to me it would be a wise policy to induce the owners of meritorious specimens to offer them for competition, rather than be compelled to purchase for account of the Exposition. Some of the rarest and most beautiful plants could not be bought or borrowed, and the only way in which they could be secured would be to offer competitive prizes. Both committees and Director General Davis have recommended the appropriation, which practically insures its passage. This amount will be sufficient to secure a magnificent display."

Government aid to Horticulture. There is probably no class of citizens which receives so much direct and specific aid from the national and state governments as the tillers of the soil. The national government has not only endowed an agricultural college and an experiment station in every state and territory which desires these privileges, but it also maintains a large corps of experts in the Department of Agriculture, whose duty it is to investigate the condition and promise of nearly every branch of agriculture. There is a growing appreciation of all these endeavors, a fact which proves that there is a general awakening among the farming population. And yet it is always needful to recall the advantages of our public institutions. The particular points in which the Department of Agriculture appeals to horticulturists are set forth in the following address by Assistant Pomologist W. A. Taylor, before the Michigan Horticultural Society :*

Department of Agriculture.

"Though often hampered by lack of sufficient appropriation and by frequent changes of policy, the history of governmental work in the interest of agriculture, since its beginning in 1840, shows almost constant progress and widening of field. During recent years, in consequence of more liberal appropriations and the more judicious application of effort, made possible by the rapid advances in agricultural science, the progress has been particularly gratifying. Though the attention given to topics relating strictly to horticulture has been comparatively small, there has been much accomplished in the past, as will be found by reference to the reports issued in previous years. For a time experimental work was carried on, and lists of varieties of fruits and vegetables were made, and reports published, together with cultural directions and advice concerning special crops. This work has been mainly abandoned in consequence of a lack of proper facilities, and the assumption of that work to a great extent by the experiment stations of the different states. The distribution of seeds, though often the subject of merited criticism, has resulted in general good. The best results achieved in this line have been for the grain-grower rather than for the horticulturist, apparently because the subject of grains has been more carefully investigated and more systematically studied. With adequate appropriations, and the application of scientific methods by trained workers now available, there seems to be no good reason why as much should not be accomplished in this line for the horticulturist as for the general farmer.

"As now organized, most of the work that is of particular interest to gardeners and fruit-growers is done by four of the sixteen divisions, which, with the bureaus of animal industry and the weather, make up the working force of the department. These are the divisions of entomology, vegetable pathology, pomology, and gardens and grounds.

"The scientific work of the division of entomology is devoted first, to study and classification of insects, whether injurious or not A change of habit often develops a dangerous insect pest from a species previously harmless. It is thus found necessary to study and record life histories of insects not now injurious, in order to be able to discover more quickly the weak point for attacking it, should the species become troublesome. Foreign as well as native species are thus studied, and particularly those already troublesome in other countries and likely to be imported unawares. As an instance of the care exercised in this regard, there may be cited the case of an insect enemy of the peach now found in the Burmuda islands, and thought to have been brought there from the Mediterranean, where it has long been known as an enemy of the orange and some other fruits. As it is figured and described in the department report for 1890, it can hardly reach the coast of Florida before being recognized and reported. To provide for better facilities for this study of life histories, a building has just been erected where temperature and other conditions can be controlled and the work done more accurately. Experimental work with insecticides and apparatus for applying them is carried on by special agents of the division in different parts of the country, and the search for parasitic foes of injurious insects is kept up both at home and abroad. The successful combating of the cottony cushion-scale, in the orange-groves of California, by means of *Vedalia cardinalis* introduced from Australia, has stimulated effort in this direction, and several importations of parasitic insects have been made. One of special interest to horticulturists is a reimportation of a European parasite of the cabbage-worm, which has been successfully placed at Ames, Iowa, and is reported to have become very abundant and to have greatly reduced the number of cabbage-worms. An agent has also been sent to Australia to investigate. and, if thought advisable, to import certain beneficial insects likely to be valuable in California.

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*See also ANNALS for 1889, 71.

Department of Agriculture.

"As is indicated by its name, the division of vegetable pathology devotes its attention to diseases affecting plants. This is comparatively a new line of scientific work, and in consequence much attention is necessarily paid to work of description and classification of fungi and bacteria affecting plants. When reports of new plant-diseases are received, specimens are secured and a microscopic study is made to determine the cause of the disease if possible. Usually this is done by growing the suspected germs in artificial culture media, such as sterilized gelatine or solutions selected for the purpose. Inoculations are made on healthy plants with germs thus grown, and if the diseased condition results, it is regarded as satisfactory proof that the germ sought has been isolated. The life-history of the germ is then studied to detect the period in its existence when it is most susceptible to attack, and various remedies are tested in a small way until some are found that are thought to be at the same time safe and efficient. These are then tested on a larger scale under similar conditions, in regions where the disease is most disastrous, with a view to determining the most efficient of the remedies tested, their comparative cost, and the best and most economical means of applying. Results obtained are published from time to time, with directions as to methods and means of application of the remedies. These published results are sent to all persons who apply for them, or who are known to be interested in the matter. The methods of preventing and controlling black-rot and mildew in the grape are now so well-known that they need not be mentioned here. Experiments on that subject have been continued, however, during the present season, and it has been found that much less copperas is required than was formerly used in Bordeaux mixture, thereby reducing the cost of application from $14 per acre to $2 per acre. The experiments on control of twig-blight in nursery stock, conducted at Geneva, New York, during the season just passed, under the direction of one of the assistants in this division, have been made on some three million trees of cherry, apple, quince, pear, and other fruits in the nursery, and are regarded as very satisfactory. Work on pear-blight, California vine disease, diseases of the citrus fruits, rot of sweet-potatoes, and a bacterial disease of oats, is in progress, as well as that on a number of diseases affecting greenhouse plants and some fungous diseases affecting insects. The investigation of peach-yellows has been actively continued, and as a result of three years' work with every fertilizer likely to have the desired effect, no instance has been found either of prevention or cure of yellows in the peach by fertilizers. This has been a disputed point among the investigators of the subject, and its settlement narrows the field and indicates the line of research for future work. A more virulent disease than yellows has been discovered on the peach in Georgia, and the fact that it is readily communicable, by bud-inoculation, has been established.

Department of Agriculture.

"The division of gardens and grounds has charge of the grounds and greenhouses of the department. Formerly much experimenting was done, particularly with fruits, but the gradual encroachment of buildings and permanent ornamental planting has so reduced the available ground that but little experimental work is attempted. The attention of the superintendent of gardens and grounds is now largely devoted to the propagation and distribution of plants and trees likely to be of economic importance. Over 100,000 specimens have thus been sent out during the past year to different parts of the country. Judgment is exercised as to the probable adaptation of species and varieties to the region where they are sent, and to the economic importance of the plants distributed. The success of the Russian apples, the Japanese persimmon, the Washington Navel orange, and numerous other fruits introduced mainly or entirely through the efforts of the division, are indications of the good it has accomplished. A catalogue of economic plants has recently been issued, and a bulletin on horticulture and kindred subjects, which has been very favorably received by the horticultural public. It contains a number of articles prepared by the superintendent of gardens and grounds, and previously published in the annual reports, but now brought together in convenient form for reading and reference.

"The work of the division of pomology naturally divides itself into three lines:

"First, the Scientific: This includes such investigations in economic botany as seem necessary at times to establish a foundation for experimental work in the improvement of fruits. An instance of this is the work done by T. V. Munson, of the division, on the wild grapes of North America. A preliminary bulletin has been published on this subject, giving a revised classification of the genus vitis, with suggestions to experimenters on the grape, based on cultural as well as botanical characteristics of species. Colored plates showing fruit, wood and leaves of the more important species are in preparation, and will be ready as soon as funds for publication of the complete monograph are available. A similar investigation of the genus prunus, which contains our native plums and cherries, is badly needed, and promises rich returns for the labor spent on it, but the fund now at the command of the division is not sufficient to justify the undertaking until other work already begun is nearer completion. The same cause prevents a thorough and systematic investigation of other wild fruits, as the working force of the division is kept fully occupied by office-work, and only a very limited sum is available for the work of field agents.

Division of Pomology.

"Second, the Economic: Under this head come investigations of foreign fruits likely to succeed in this country, and importations of promising varieties. This requires a careful, comparative study of soils, climates and markets, and of labor conditions as well, for a fruit crop is not necessarily profitable because the yield and quality are satisfactory. Selling value and cost of production are important factors. It is in this line that the recent importations of date-palms have been made and placed at different places in New Mexico, Arizona and southern California, where the conditions indicate that the date of commerce can be profitably produced. Importations have also been made of choice varieties of the fig and the Persian grapes, and of the market varieties of the citron of commerce, of which thousands of dollars' worth are annually imported from Europe and Asia. Under this head comes the investigation of the subject of nut-culture, now in progress. Systematic inquiry has been made in all parts of the country concerning the extent to which the growing of nuts for market has been carried on, and a number of important and interesting facts have been brought out. The report on this subject, now awaiting the completion of the illustrations, will discuss varieties, improvements already made and likely to be made, methods of propagation and culture, adaptation of varieties to soil, and methods of marketing, etc. As a means of drawing attention to our leading market fruits, and stimulating foreign interest in our orchard products, the division recently sent to the Scottish Horticultural Association meeting a small exhibit of leading varieties of market apples from several states. These were collected and contributed by a few public-spirited growers, and forwarded with the growers' names attached.

Division of Pomology.

"Third, the Advisory: The third general work of the division may be called advisory. In consists first in the publication of information to growers, concerning varieties, methods of culture, etc., of various fruits. There have been issued thus far in this line a report on tropical and semi-tropical fruits in the United States, Russian and other fruits in the northwest, and one on the relative merit of various stocks for the orange. There are in course of preparation similar reports on small fruits, the apple and the peach. So far as adaptation of varieties to localities is concerned, these are based on reports of correspondents numbered by the thousand, and living in every state and territory in the Union. The reports will be illustrated, and will contain descriptions of recommended varieties and a carefully revised list of accepted names and synonyms. The second division of this line of advisory work brings the division into immediate contact with the fruit-growers, and forms one of its most important duties. This consists of the examination of new and the identification of old varieties of fruits, and other matters requiring an immense amount of individual correspondence. As an illustration of what is done in this line, I have made the following analysis of work of this sort done in October, 1891, as shown by the correspondence-files and office-records:

Letters written during October	584
Relating to identification of varieties	73
Relating to examination and opinion of value	69
Relating to nomenclature	20
Relating to choice of variety for particular localities, methods of culture and pruning, etc.	422
Samples consisting of fruit, from one to many specimens each, received for examination during the month	537

"This may be taken as a fairly representative month, so far as the amount of office-work of the division is concerned, though the nature of it changes with the subjects receiving the attention of fruit-growers at different seasons of the year."

Farmers' institutes. Another movement, which, in one way or another, derives its support from government, is the farmers' institute. This enterprise, which has exerted an incalculable influence upon the farmer's work and life, is now widespread, and in the older states it may be said to be at the height of its power. The centralized movement in the various states will no doubt subside after a few years, but its impetus, instead of being lost, will have been absorbed into every community in the state, where it will ever remain an inspiration to better methods and higher life. The institute is inseparably connected with the great educational movement of the time, which expresses itself in liberal methods, in technical societies, and in university extension.

Farmers' institutes.

The history of the origin of the farmers' institute is obscure, but it is certain that the movement began earlier than we have been led to suppose. It began to assume definite shape early in the seventies, when several states undertook to hold farmers' meetings upon essentially the same plan as they proceed at present. As early as 1869 and '70, such meetings were held in Iowa by Welch, Roberts, Bessey, Jones, Matthews and Mrs. Tupper, the expenses being met by the community in which the institute was held. In 1871 an account of "Farmers' Institutes" was published in the Report of the Board of Trustees of the Iowa Agricultural College,* in which it is said that "the experiment of holding farmers' institutes in different localities in the state, for the purpose of giving familiar lectures on prominent topics in agriculture, was tried last winter with very gratifying success. Institutes lasting three days were held at Cedar Falls, Council Bluffs, Washington and Muscatine, at each of which points we found an enthusiastic gathering of farmers." Vermont, Michigan,† and some other states inaugurated institutes about this time.

History of institutes.

The origin of the itinerant lecture system for the instruction of farmers is to be sought long before this time, however. As early as 1842 or '3 such lectures were inaugurated by the New York State Agricultural Society, and these were so successful that the society adopted the following resolution at a meeting held in Albany, January 20, 1848:

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*Country Gent. 1887, 873.

†For a history of Michigan institutes, see Rep. Mich. Bd. Agric. 1875, 72.

"Resolved, That the plan which was adopted by the former secretaries of the New York State Agricultural Society, Daniel Lee, Joel B. Nott and Benjamin P. Johnson, in addressing, at suitable times, county agricultural societies, meets the decided approbation of the committee, and they trust it will be continued hereafter; and they recommend the adoption of the resolution."

Institutes in New York.

Massachusetts early took steps to inaugurate a series of farmers' institutes through the endeavors of the State Board of Agriculture. The first reference to such meetings is to be found in the records of the Secretary of the State Board of Agriculture under date of January 21, 1859, when it was voted by the board "to appoint a committee to consider and report upon the propriety of instituting meetings similar to teachers' institutes." This committee reported February 3, 1859, in favor of holding such meetings, and recommended that they be commenced as soon as possible. February 1, 1871, the board voted "that the various agricultural societies of the commonwealth be requested to organize an annual meeting for lectures and discussions at such time and place as may be convenient for each society; these meetings to be denominated 'The Farmers' Institutes of Massachusetts.'" February 7, 1878, it was voted: "That the agricultural societies receiving the bounty of the commonwealth, be requested to arrange and hold one or more farmers' institutes each year within their limits; and that they be informed that the board will render all the assistance in its power to make such institutes instructive and useful to the public." February 6, 1879, this vote was amended by substituting the word "required" for "requested," and changing the number to be held each year from "one" to "three." February 5, 1880, it was voted: "That in the opinion of this board it is expedient that the secretary attend as many farmers' institutes as the other duties of his office will allow." February 3, 1887, it was voted: "That the rule requiring societies receiving the bounty of the state to hold at least three institutes during the year, be restated and enforced." February 7, 1889, the board adopted the following rule: "Each agricultural society receiving the bounty of the Commonwealth is hereby required to arrange and hold not less than three farmers' institutes each calendar year within its limits, and the board will render all the assistance in its power to make such institutes interesting and profitable. The secretary is expected to attend as many of these institutes as is compatible with the other duties of his office, and he will provide lecturers for the institutes as far as the appropriation for this object will warrant. And the several agricultural societies are earnestly requested at their annual meetings to fix the dates at which they will hold the several institutes required, and the subjects they desire to have discussed, and at once notify the secretary of the board if they desire assistance in the procuring of lecturers. Societies may arrange and hold more than three institutes if they so desire, and the secretary of each society is required to certify to the holding of each institute, upon blanks provided by this office.'' During the calendar year 1890 36 societies held 129 institutes. No regular amount has been or is now appropriated by the state to pay the expenses of these institutes. The state grants an annual bounty of $600 to each incorporated agricultural society complying with the law and with the regulations of the Board of Agriculture. Since 1863 the Board of Agriculture has held an annual three days' country (preferably public winter) meeting in some section of the commonwealth for lectures and discussion, which have appeared annually in the *Agriculture of Massachusetts*. March 20, 1869, the legislature approved an act which, among other things, authorized the expenditure for other clerical services (over and above one clerk with fixed salary) in his office, and for lectures before the board of agriculture, at its annual and other meetings, a sum not exceeding $400. In 1887 this amount was increased to $800 per annum. This amount has been used each year to pay lecturers, stenographers' services, etc., at this meeting.

Institutes in Massachusetts.

The legal authority for the holding of institutes in Michigan, in connection with the Agricultural College, is held to be derived from the following clause in the organic law of 1861: "The State Board of Agriculture may institute winter courses of lectures, for others than students of the institution, under necessary rules and regulations.''

Michigan.

This Michigan law possesses unusual interest, for it is probably the first authority conveyed upon an educational institution in this country to carry instruction to farmers who are not students in the college. And this recalls the fact that the farmers' institute movement is essentially university extension,* inasmuch as the greater number of the institutes are held under the auspices of the agricultural colleges. The vital connection which exists between these colleges and the institutes, may be learned from a study of the statistics presented on the following pages ; and it may also be said that even in those states in which this official and legal connection does not exist, the teachers in the colleges are expected to identify themselves with the institute work. The institute movement lacks much of the definiteness of specific university extension, however, but the ultimate aims of the two are the same, and writers upon university extension are recognizing this fact. The following excerpt from a paper upon "University Extension and its Leaders," by Professor Herbert B. Adams, of Johns Hopkins University, in *Review of Reviews* for July, 1891, indicates the position which the farmers' institute movement holds in the minds of educators :

University extension.

"Of great importance for the higher education of the farming population of this country are the so-called farmers' clubs and institutes, which have increased and multiplied since the agricultural college grant of 1862. Professors S. W. Johnson and Brewer, of New Haven, rendered early and conspicuous service as lectures to the farmers' institutes of Connecticut. Like mechanics' and teachers' institutes, these voluntary associations of American farmers are likely to lead ultimately, under right management, to a much higher appreciation of the possibilities of the agrarian situation than now obtains, and also to a clearer conception of civic duty. It is by the cordial alliance of the higher educational forces of each state with the industrial and agricultural, that the best interests of the commonwealth can be subserved. One of the most interesting types of farmers' institutes may be found in Wisconsin, where over 60 of these organizations met last year for two days each, at convenient centers in different parts of the state. University professors and scientific experts are in the habit of giving familiar talks at these farmers' institutes, and of promoting popular education as well as scientific agriculture. Farmers come to these meetings with their wives and children. School-teachers and young people often contribute to the literary exercises. The Wisconsin State University, under the wise and practical guidance of Professor Chamberlin, has endeavored to coöperate in every possible way with the higher educational interests of the farming population, who have generously responded this year by an extra grant of $50,000 to the university. Mr. Charles Dudley Warner, in his *Studies of the Great West*, published

Institutes and education.

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* "University extension means university education for the whole nation, organized upon itinerant lines." In any community classes may be organized to which a teacher from the college or university gives instruction, with occasional examinations.

in *Harper's Magazine*, April, 1888, said: 'Wisconsin is working out its educational ideas on an intelligent system, and one that may be expected to demonstrate the full value of the popular method—I mean a more intimate connection of the university with the life of the people than exists elsewhere. * * * The distinguishing thing, however, about the State University is its vital connection with the farmers' and agricultural interests. * * * I know of no other state where a like system of popular instruction on a vital and universal interest of the state, directed by the highest educational authority, is so perfectly organized and carried on with such unity of purpose and detail of administration no other in which the farmer is brought systematically into such direct relations to the university.' Farmers' institutes also flourish in the state of Indiana, where they may be found in every county and in close relations with Purdue University, the agricultural college of the state. Professor Jenks says: 'Part of the lectures given in these institutes are by the university professors, and are, of course, of a thoroughly scientific and scholarly nature.'"

Evolution of the institutes.

The institutes are now undergoing a transformation. Farmers are constantly asking for more specific instruction, and courses of technical lectures upon a series of intimately related topics are in demand. This demand has given rise to itinerant "dairy schools" and similar organizations in various states. The institute bureaus in some cases publish a roster of speakers, with announcement of their subjects, and from these lists the different localities select their lecturers. The Pennsylvania Board of Agriculture, for instance, publishes this year a list of 55 speakers who treat upon nearly every subject of rural economy and practice.

The demand for definite and consecutive instruction in agriculture has brought forward a number of schemes looking to the intensification and extension of the institute system. The following plan by Professor H. H. Wing of Cornell University will commend itself to the reader: *

Agricultural extension scheme.

"The system of farmers' institutes that has been maintained for some time in New York state has undoubtedly done more than any other single thing toward lifting up and enlightening the general mass of farmers, and advancing the interests of agriculture as a whole. These institutes are now in the full tide of their usefulness, and in all probability will continue the same good work for many years to come; but it has occurred to me that the time is at hand when they should be supplemented by instruction that should continue over a longer time, that should be more detailed, definite and specific in character, and therefore make a more lasting impression upon the minds of the learners. It seems to me that the demand for such instruction is greater in those places where the institutes have been of most effect than elsewhere, and that a scheme something like the following could be quite easily carried out and would lead to far-reaching and lasting benefits:

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* *Rural New-Yorker*, li. 35.

"Let there be organized, under competent state authority, in various parts of the state, classes in agriculture, which should extend over a period of at least 10 weeks and should meet weekly. They should be presided over by a competent instructor and should admit regular students upon the payment of a nominal fee; the students registering in these classes should be required to attend regularly, and at the end of the course should be subjected to examination, preferably under the care of the Regents of the State University, and those passing should receive 'pass cards,' which, when a sufficient number were obtained, should be followed by a diploma, as is now done in the case of academy and high school pupils.

"It will be seen that the scheme embraces the formation of clases in all the various branches of applied agricultural science. Some of the courses that would naturally be organized would be on the origin and formation of soils and principles of culture; production, care and use of farm manure; the breeding and rearing of domestic animals; principles and practice of stock-feeding; dairy husbandry; the chemistry and physiology of plant-growth; the principles of plant propagation; fruit-growing in all its branches; injurious insects and their remedies, etc., etc. In short, all those applications of practical and natural science for which the common and high schools now make no provision, should have a place.

Agricultural extension scheme.

"The details of the arrangement of such classes and courses could, of course, be varied to suit circumstances; for instance, one instructor could very easily give instruction in two distinct but related courses, one in the morning and one in the afternoon, and could meet classes every day in the week in localities not too widely apart; so that one instructor could well take charge of six classes in each of two courses, and when he had finished his course could give way to another, who should take the same classes in some other branches. In this way twelve classes in six localities could very easily get instruction in six different courses during three terms of 10 weeks each, from October 1 to May 1. In all probability the greater number of the persons desiring instruction such as that here outlined would be young men and young women, and the instruction should be designed primarily for them; but an important feature of the whole scheme should be the opening of all such classes to whomsoever might desire to attend. In this way older persons might get the benefit of the lectures and discussions, but need not be tied down to regular attendance.

"There should be very little difficulty in getting suitable quarters for holding such classes. Grange halls, farmers' club-rooms, and undoubtedly, in many places, rooms in high schools or academies could be readily had. Nor would it be a difficult matter to find teachers; those who have attained the best success in the farmers' institute work would for the most part make admirable teachers and leaders for such classes of young men. A large number of the better-informed high-school principals would make admirable teachers demanding most knowledge of pure science, and last, but not least, a large and increasing number of graduates of our agricultural colleges could find here an excellent field to extend their usefulness. Such is a brief outline of what I believe to be a most desirable form of agricultural university extension; is it not practicable?"

The farmers' institute has exerted a most powerful influence upon the agriculture of the country. It is in the highest sense a philanthropic and patriotic movement. It has met, perhaps, with the most marked success in Wisconsin, and it is not surprising that the superintendent of the institutes in that state, W. H. Morrison, should write thus enthusiastically of the results :

> "I wish that you had the history of this movement in Wisconsin—how the institutes have stimulated a pride and respect for agriculture, bringing farmers together to compare and pool experience! They give the farmer an opportunity to meet masters in agriculture, men who make the business of farming a science and a life-work. They build up and unite farm interests, energize and fertilize local thought, make men and women better satisfied with the farm, and will have the tendency to keep a fair portion of the best boys on the farm. They are revolutionizing agriculture in this state, and their power was felt and heeded by our legislature last winter. Fortunately, our farm institute work is under the auspices of our State University. My office is in the same building with Professor Henry, Director of the Experiment Station, and whatever may come from his experiments that will aid the farmers of the state is taken by our farm institutes and scattered all over the state. The fact is, they are doing more for the state than the originators of the law ever thought or expected. He builded better than he knew. They are educating our farmers to better methods, and increasing the rewards of the farm. Seventy to seventy-five institutes are held each winter, attended by an average of over 500 farmers, making them a great feeder to all the courses in the University. And, lastly, they are advertising the resources of Wisconsin, as we issue annually 31,000 copies of a farm institute bulletin."

Institutes in Wisconsin.

Nearly $85,000 is being spent this year in North America for farmers' institutes. The following statistics of institutes I have gathered directly from secretaries of state and secretaries of boards of agriculture, and they may be regarded as correct for the current year:

ALABAMA.—Annual appropriation, $3,000.

ARKANSAS.—No appropriation has been made, nor has the general assembly ever made any law for the purpose of fostering farmers' institutes.

ARIZONA.—No appropriation has been made.

CALIFORNIA.—No farmers' institutes. The appropriations in the interest of agriculture are made through the state and district agricultural associations.

Statistics of institutes.

CANADA.—*Ontario.*—The number of farmers' institutes organized in Ontario, as reported in 1890, was 78. These each receive a grant from the Ontario government of $25, and a similar grant from the county council of the municipality in which the institute is organized. Besides this, the Ontario government is giving $2,000 this year to defray the expenses of the professors at Guelph, who devote the greater part of January in each year to attendance at these meetings. The Guelph officers divide up into three or four groups, and take with each group a representative of the Fruit-Growers' Association and one or two representative farmers ; and they are out continuously for three or four weeks, going from place to place holding meetings which have been previously arranged for and advertised. There is also a central farmers' institute which holds its meeting annually in Toronto for three days, and at this meeting one or more persons represent each farmers' institute in the province. The government grant to this is $800.

Manitoba.—There are about twenty or twenty-five farmers' institutes in Manitoba, each one of which receives $25 a year from the provincial funds.

Nova Scotia.—There is no regular organization for farmers' institutes in this province, and no money is given by the government specially for this purpose. Professor Smith, principal of the Agricultural School, is holding meetings in the western counties of the province, and one of the graduates of the school is to be employed to lecture in the Cape Breton counties during the winter. The expenses of these officers are borne by the government.

COLORADO.—No direct appropriations have been made by the general assembly for the purpose of supporting and conducting farmers' institutes. The State Board of Agriculture has annually set aside a certain sum to be used for the purpose of defraying the expenses of professors attending such institutes held in different parts of the state. Since the year 1888 a record has been kept of the amount expended for this purpose, which is as follows: For the year 1888, $99.55 ; for the year 1889, $56.60 ; for the year 1890, $121.80 ; for the year 1891, $90 ; for the year 1892 the sum of 500 has been appropriated for said purposes.

CONNECTICUT.—No appropriation. The Board of Agriculture holds an important winter meeting from its own funds, and about $200 per year is otherwise expended for institute work.

Statistics of institutes.

DELAWARE.—Annual appropriation, $200 to each of the three counties. An act providing for the holding of farmers' institutes was passed March 29, 1889. The object of the institutes is defined to be "the discussion orally, or by written essays or papers, of agricultural or kindred matters, and for the dissemination of agricultural knowledge among the farmers of the state."

FLORIDA.—No appropriation.

GEORGIA.—No appropriation.

ILLINOIS.—In 1889 the thirty-sixth general assembly appropriated $100 per annum for the use of each congressional district in the state holding farmers' institute meetings. There being twenty congressional districts, the sum appropriated therefore amounts to $4,000 for the two legislative years. There was paid to the districts holding farmers' institutes from said appropriation, the sum of $3,000. The thirty-seventh general assembly, 1891, passed an act appropriating the sum of $50 annually for two years to each county farmers' institute ; there being 102 counties in the state, the appropriation therefor amounts to the sum of $10,200. But few of the counties have yet held meetings, but most of them will probably hold institutes, and will draw the amount appropriated for the holding of them.

INDIANA.—Annual appropriation, $5,000.

IOWA.—No appropriation. Last winter the State Agricultural Society and the Agricultural College appropriated a small sum. Institutes are held, but they are supported by individuals or societies.

KANSAS.—No appropriation.

KENTUCKY.—The first appropriation for state institutes was made in May, 1890, when the legislature passed an amendment to the law creating the Bureau of Agriculture, and required, among other things, that institutes be held in different parts of the state. The total appropriation to the Bureau was $13,000, but no definite sum was specified for institutes. Five institutes were held in the fall of 1890, nine in the spring of 1891, and about nine more will be held during the present winter. The cost of these institutes averages about $100 each, so that about $1,000 may be said to be spent for them annually.

LOUISIANA.—No appropriation.

MAINE.—Annual appropriation, $3,000. The secretary of the Board of Agriculture and one member are obliged to hold two institutes yearly in every county.

MARYLAND.—No appropriation.

MASSACHUSETTS.—Each incorporated agricultural society in the state complying with the state law and regulations of the Board of Agriculture (see page 138) receives an annual bounty of $600. Each society must hold at least three institutes each year. In 1890, 36 societies held 129 institutes.

The State Board of Agriculture also holds one public three-days meeting each year, for which $800 is expended. The state also appropriates funds for other general institutes, and for these institutes from $600 to $700 is used.

Statistics of institutes.

MICHIGAN.—No separate appropriation. An item for farmers' institutes is inserted annually in the appropriations made to the State Board of Agriculture. This was first given in 1876-7, the amount being $164.30. It has varied from that amount to $750, which is the present appropriation per year.

MINNESOTA.—Annual appropriation, $7,000. The first appropriation, $5,000, was made in 1887.

MISSISSIPPI.—No appropriation.

MISSOURI.—Last appropriation, for each of two years, $5,000. Expenses of members of Board of Agriculture attending meetings, per year, $500. During the present winter, institutes will be held in 56 counties of the state.

The institute work was established in 1882 by Professor J. W. Sanborn, then secretary of the State Board of Agriculture. The Board was then receiving $2,500 per annum to carry on all its work, and out of this sum the expenses of a very limited series were met. By the aid of members of the faculty of the Agricultural College, who gave their time during vacations and when they could be spared from their class-room work, and volunteer assistance from public-spirited farmers, the work was carried on without any special appropriation for the purpose from the general one made to the Board, and which at any time never exceeded $3,000 per annum. The work progressed slowly from the time of its organization, and steadily grew in popularity until the demand was so great for institute meetings that the legislature recognized the necessity for making a liberal appropriation for carrying it on. The institute work did more toward securing the increase from $3,000 to $12,000 per year for carrying on the work of the Board of Agriculture than any other of the lines of work which the Board prosecutes.

MONTANA.—No movement has been made to establish farmers' institutes.

NEBRASKA.—No appropriation has been made by the state. Institutes have been held for 10 or 12 years, however, through the efforts of individuals and societies. About 50 institutes are arranged for the present winter. These are supported by appropriations from the following sources: Board of Regents of the State University, $300; State Board of Agriculture, $100; State Horticultural Society, $100; State Dairymen's Association, $100. These institutes are to be followed by a week or ten days' institute at Lincoln, under the auspices of the State University, NEVADA.—No appropriation.

NEW HAMPSHIRE.—About $1,000 is now used annually for farmers' institutes. Heretofore, the amount has averaged about $600.

NEW JERSEY.—About $2,000 of the amount appropriated to the State Board of Agriculture is used annually for institutes. The county boards of agriculture hold meetings which are of an institute character, and these boards receive some of the general funds appropriated to the State Board. Sixteen county boards are now organized.

NEW MEXICO.—No appropriation.

NEW YORK.—Annual appropriation for last four years, $10,000. The first appropriation, $6,000, was made in 1887. From 70 to 80 institutes are held each winter, under the personal charge of a director selected by the State Agricultural Society.

NORTH CAROLINA.—No appropriation. From $250 to $500 per year has been devoted to institutes by the State Board of Agriculture from its own funds. The first institutes were held in 1886 or 1887.

NORTH DAKOTA. No appropriation.

OHIO.—There is no specific appropriation by the state for farmers' institutes. The funds come from the county treasuries, each county to appropriate not more than $200 annually. For 1890–1 the total fund spent for institutes in Ohio was $7,823.56, and about this sum will probably be expended each year. In 1890–1, 124 institutes were held under the auspices of the State Board of Agriculture. In 1886–7 there were 50; 1887–8, 60; 1888–9, 62.

Statistics of institutes.

OREGON.—No appropriation.

PENNSYLVANIA.—1885, $1,000; 1886, $1,000; 1887, $3,000; 1888, $3,000; 1889, $5,000; 1890, $5,000; 1891, $7,000; 1892, $7,000; also $1,500 for expenses of members of the State Board of Agriculture in attending meetings. Each county agricultural society elects a member of the State Board, and each member is responsible for the institutes and expenditure of funds in his district. In 1890-1, 61 institutes were held. This winter about 100 will be held.

RHODE ISLAND.—No specific appropriation. About ten institutes are now held during the year at an average cost of about $40 each. These are held under the auspices of the State Board of Agriculture. For a few winters previous to 1889–90, the State Agricultural Society held a course of about six lectures at the society's rooms in Providence, and the expense of them was borne jointly with the Board of Agriculture. Comparatively few farmers could attend these meetings, and two years ago (January, 1890) the Board held an institute in Kingston, following the meeting of the State Grange. Since then institutes have been held in various parts of the state.

SOUTH CAROLINA.—The State Agricultural Society, for a number of years, commencing about 1874, held summer meetings in different parts of the state, at which essays were read and discussions had on agricultural topics, but no funds were appropriated for this purpose till 1877 or 1888, after which amounts ranging from $200 to $300 were expended annually for this purpose by the Department of Agriculture, until the abolishment of this Department, which occurred in December, 1890. The duties of the department of agriculture are now devolved on the trustees of Clemson Agricultural College, and it is their purpose to encourage farmers' institutes in every way possible.

South Dakota.—The last session of the state legislature authorized the board of trustees of the State Agricultural College to provide for holding farmers' institutes during the coming winter in various parts of the state. Accordingly the trustees directed the faculty of the college to provide programmes, and arrange for a series of five institutes during December and January, 1891–2. As no funds were appropriated by the legislature, and as there are none at the disposal of the trustees for this purpose, all expenses must be met by the communities where institutes are desired. These expenses cover the rent of rooms where the meetings are held, with lighting and heating, the printing of notices and programmes, and the necessary traveling expenses of those members of the college faculty whose services may be desired. The college prints a roster of its officers who can take part in the institute work, with the subjects which they wish to discuss. Communities that desire institutes apply directly to the college.

Tennessee.—The state has never made an appropriation for the special purpose of organizing farmers' institutes. The present commissioner of agriculture has commenced the work, and over one-half of the state has been organized. The work is done by the assistant commissioners in connection with their general work, and they are paid out of the general appropriation made for this department.

Statistics of institutes.

Texas.—Annual appropriation, $500, to be used under the direction of the Agricultural and Mechanical College. It is expected that one institute shall be held in each congressional district.

Utah.—No appropriation.

Vermont.—2,500 per year. Every other year a report is printed from the Board of Agriculture at a cost of $1,500.

Virginia.—No appropriation has been made. Out of its general funds, the State Board of Agriculture last year used $250 for institutes.

Washington.—No appropriation.

West Virginia.—No appropriation.

Wisconsin.—Annual appropriation, $12,000. The first funds were given six years ago. The first two years the annual appropriation was $5,000. The proceedings of the institutes are each year condensed into a volume, of which 31,000 copies are issued. From 70 to 75 institutes are held each winter, with an average attendance of over 500.

Wyoming.—No appropriation.

Itinerant lectures in England.

An important educational movement has been inaugurated in England this year by the Fruit Growers' Association.* The following scheme for forty lectures is prepared by a committee of the Association: *First stage.* Plant-life.—Seeds: nature of, and germination; requirements of growth—water, heat, air. Soils: nature and composition. Roots: nature and functions; branches, fibrils, and root-hairs; what they do and how—what helps, what hinders them. Stems and branches: their nature, work and uses—helps and hindrances. Leaves: what they are, what they do—helps and hindrances.

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*Gar. Chron. 3 ser. x. 520.

Buds and tubers: leaf-buds, flower-buds, tubers. Growth: increase in size and changes of composition, formation and storage of food materials. Flowers: their component parts; what they do. Fruit: changes and development during ripening; forms and varieties—apple, strawberry, plum, etc. *Second stage.* Elementary operations.—Description and use of implements under each head. Operations connected with the land, with explanations and illustrations of good and bad methods—digging and trenching, draining, hoeing, stirring the soil and weeding, watering. Preparation of seed-bed: rolling and raking; sowing, transplanting and thinning. Potting. Planting: positions and shelter; staking; earthing and blanching. Propagation: elementary principles—cutting, budding, grafting, layering; insect and fungous pests. *Third stage.* Advanced practice.—Budding. Grafting and stocks used. Layering. Division. Branch-pruning. Root-pruning: old and young trees and bushes. Fruit-culture: open air and under glass; small fruits; apples and pears; stone-fruits; gathering and storing; packing and marketing. Vegetable culture: tubers and roots; green vegetables; fruits and seeds (peas, beans, etc.); rotation of crops. Flower culture: outside and under glass; manures and application. Treatment of insect pests; treatment of fungous pests. General knowledge of fruits.

Agricultural extension in England.

A university extension movement in relation to agricultural topics has been started in Kent. In upwards of 60 villages courses of six lectures have been given upon agricultural chemistry, botany, entomology and related subjects. The funds were provided by a grant of £3000 from the Technical Education Committee of the Kent County Council. This is said to be the first attempt in England "to bring before rural audiences some of the elementary scientific principles which underlie their daily work."

Horticultural Societies.

Numerous societies are prosecuting work of essentially the same character as that pursued by the farmers' institutes, and with the additional advantages of permanence of organization which insures more consecutive endeavor. There are in North America a dozen horticultural societies of a national or general character, and over 50 state, provincial and district societies. In addition to these there are some hundreds of county and local societies, of which statistics have never been collected. The greater number of these societies are of comparatively recent origin. In 1852, A. J. Downing wrote as follows in his preface to Lindley's "Theory of Horticulture": "Within the last ten years the taste for horticultural pursuits has astonishingly increased in the United States. There are, at the present moment, at least 12 societies in different parts of the Union devoted to the improvement of gardening, and to the dissemination of information on the subject." All the stronger societies receive instruction from experts in various departments of horticulture, and as nearly all of them publish reports of their proceedings, they create a large and invaluable portion of the permanent literature of horticulture. The transactions of these societies never have been appreciated as their merits deserve, for while very many of them lack the supervision of a skillful editor, they are all valuable as storehouses of personal experience.

Societies and education.

The society may now be considered to be an indispensable adjunct to any progress in horticulture, a proposition which finds confirmation in the fact that the extent of enthusiasm in any meeting is usually in direct ratio to the value of the horticultural interests in the community. Writing upon this point, Charles A. Green makes the following remarks :*

> "Considering all the aspects of the case, any person who can look back upon the history of fruit-growing will concede that remarkable changes have taken place, and that every year we have been making wonderful progress. Nowhere can this fact be so clearly seen as at our horticultural meetings. A list of subjects that would have been acceptable ten years ago at such meetings would now be considered unworthy of discussion or attention. Men who were competent to instruct the members of a horticultural society ten years ago would not now consider themselves competent. It has come to be understood that any one profitably to occupy the time of a horticultural association should be an expert in some certain specialty, and in most cases a scientific man, who has devoted his entire life to the study of one department of affairs relating to practical pomology."

The aims and results of a horticultural society have never been more pleasantly told than by Charles W. Garfield in his annual address for 1891 as president of the Grand River Valley (Michigan) Horticultural Society :

Aims of the Society.

> "Our society was organized in 1872, since which time monthly meetings have been held with creditable regularity. There have been ebbs and flows in the interest and enthusiasm manifested, but to-day the organization is

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*Green's Fruit Grower, Jan. 1892.

stronger than ever before. There have been great changes in membership and officers, and the success of the society has been due to the disinterested efforts of a few people. The questions will come up occasionally, 'What have we to show for all this expenditure of energy?' 'Has the effort paid?'

"On the debit side are the labors of the officers and members to make the meetings interesting and valuable; the annual fees that have been paid in by the members; the sacrifices that have been made to attend; the losses engendered by absence from business to attend the meetings, and duties imposed by the society.

Aims of the Horticultural Society.

"On the credit side are the good times we have enjoyed with friends whose sympathies and labors are in accord with our own; the information we have acquired by contact with people who know more about some things than we do; the brightening of our own views and methods by rubbing up against our neighbors; the crystallizing into better form our own ways of doing, through the stimulus of imparting correct information to our friends; the gathering by absorption of better ways of management, by seeing the methods our neighbors are using; the broadening of our lives by a knowledge of what others are doing, and the development of more defined views of the means to success and satisfaction in life, thus becoming better fitted to enjoy life and aid others in its enjoyment.

"How does it look to you? Has it paid to maintain this society? Could not we swell the credit side to even more considerable proportions by giving a little more thought and attention to the work of the society? Activity with good purpose brings its own reward. We can not go amiss in making the most of the days as they come to us, and the mere attainment of a livelihood is simply the first course in the foundation of real life. I feel that the freedom with which, in our society, we impart the information from our own experience which will aid others to a larger measure of success, or prevent them from making mistakes that lie in the way of success, is enough excuse for its continued existence. Our own lives are enriched and ennobled just in the proportion that we strive to assist our fellows. I have no sympathy or patience with the method that brings emoluments in proportion to the ignorance of others.

The Society as a school.

"Our meetings make a model school, at which we all willingly attend, to seek the information we wish. There is no compulsion, no straight-jacket method, simply the most delightful means of acquiring information, that, while aiding business and promoting happiness, adds to the general fund of information and aids in the general growth of the community. We who live in the country and have to deal with nature's processes, which are the source of material wealth, are apt to forget that we are in the midst of a great university, with numerous courses of study before us, and the means for a broad education within our grasp. The question constantly confronts us, Shall we sacrifice this education because we are not willing to look farther than the acquirement of means to maintain existence? If our society can aid us to wider and more liberal views of nature's processes, to an appreciation of her beautiful forms, to the utilization of the knowledge of nature's methods in adding to our equipment for getting satisfaction out of the life that is given us, it is worth the expenditure of a large measure of energy in its maintenance. I am not certain but in promoting the objects of our society, and interesting our children in the principles and practice that form the basis of success in horticulture, we may not be accomplishing as much in developing them for their life-work as by sending them to school to con lessons from books. It seems to me that we can make even more of our society in this direction than we have done.

"The man who makes his thousands in a single deal in real estate, who has added nothing intrinsically to the value of the land, may, because of his dollars, cut a wide swath in the community; but I count of far greater value to the world one who, through the study of nature's possibilities, brings out an added flower or fruit of value to mankind; and while dealers in stocks and bonds and lumber and land may laugh in derision at our enthusiasm over a new peach that fills a place in the succession of fruits, or a new chrysanthemum with added attractions of form or color, we can in our ecstasy sorrow a little that so few people in this world know how to get the highest pleasure out of life by living near to nature's heart. There is a wonderful field for improvement in the objects with which we deal; and the more we add to our knowledge of the things that lie nearest to us, the wider will open before us the door to the wealth of information, the acquirement of which will give to us the keenest delight."

The love of plants.

The aggregate attendance at meetings of the national, state, provincial and district societies for 1891 has probably exceeded 5,000. I have endeavored to collect exact statistics upon this point for the year, but I have not been able to secure figures from all the societies. The following incomplete record will have some value, however:

Society statistics.

NATIONAL OR GENERAL SOCIETIES.	*No. of Meetings 1891.*	*Average Attendance.*
American Association of Nurserymen	1	Large.
American Chrysanthemum Society	1	
American Cranberry Growers' Association	2	75
American Pomological Society	1	100
American Seed Trade Association	1	
Association of American Cemetery Superintendents	1	75
Cider and Cider-Vinegar Makers' Association of the Northwest*	1	40
Eastern Nurserymen's Association	1	15
Peninsula Horticultural Society (Chesapeake Peninsula)	1	150
Society of American Florists	1	750
STATE, PROVINCIAL, AND DISTRICT SOCIETIES.		
Arkansas Horticultural Society	2	20
California:		
Fruit Association	10	
Horticultural Society	12	30
Southern Pomological Society	33	7 to 83
State Floral Society	12	

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*Although this is not strictly a horticultural organization, much of its attention is directed to fostering apple-growing, and it may therefore be considered here.

Statistics of Societies.

	No. of Meetings 1891.	*Average Attendance.*
Canada:		
British Columbia Fruit Growers' Association	1	
Montreal Horticultural Society	2	40
Ontario Fruit Growers' Association		150
Indiana Horticultural Society	2	50 to 75
Kentucky Horticultural Society	1	40
Maine Pomological Society	1	Good
Michigan Horticultural Society	2	125
Minnesota Horticultural Society	2	50 and 300
Mississippi Horticultural Society	2	100
Missouri Horticultural Society	2	120 to 150
New Jersey Horticultural Society	1	75
New York, Western New York Horticultural Society	1	300
Ohio Horticultural Society	3	60
Oregon Horticultural Society	4	150
Pennsylvania Horticultural Society	12	45
" State Horticultural Association	1	50
Rhode Island Horticultural Society	10	25
South Carolina Horticultural Society	1	Good
Texas Horticultural Society	1	150
Wisconsin Horticultural Society	2	100 to 200

New colleges.

The same spirit which maintains the farmers' institutes and the societies seeks the establishment of agricultural schools. Several agricultural colleges and experiment stations have been organized during the year or within the few months preceding it, and it is an interesting fact in the history of the development of our country that one of these institutions is in the newly organized territory of Oklahoma. Forty-six states and territories now possess an agricultural college and experiment station. Only Alaska, Idaho and Montana have failed to establish such institutions. There is now a demand in England for technical horticultural schools. (See page 148.)

The most distinct educational movement of the year in horticultural directions is the passage of the law by the State of New York, providing for the establishment of a great botanic garden in New York city. This law was approved April 28, 1891, and is as follows :

"AN ACT TO PROVIDE FOR THE ESTABLISHMENT OF A BOTANIC GARDEN AND MUSEUM AND ARBORETUM IN BRONX PARK, IN THE CITY OF NEW YORK, AND TO INCORPORATE THE NEW YORK BOTANICAL GARDEN FOR CARRYING ON THE SAME.

"SECTION 1. Seth Low, Charles P. Daly, John S. Newberry, Charles A. Dana, Addison Brown, Parke Godwin, Henry C. Potter, Charles Butler, Hugh J. Grant, Edward Cooper, Cornelius Vanderbilt, Nathaniel L. Britton, Morris K. Jesup, J. Piermont Morgan, Andrew Carnegie, Thomas F. Gilroy, Eugene Kelly, Jr., Richard T. Auchmuty, D. O. Mills, Charles F. Chandler, Louis Fitzgerald, Theodore W. Myers, Wm. C. Schermerhorn, Oswald Ottendorfer, Albert Gallup, Timothy F. Allen, Henry R. Hoyt, William G. Choate, Wm. H. Draper, John S. Kennedy, Jesse Seligman, Wm. L. Brown, David Lydig, William E. Dodge, Jas. A. Scrymser, Samuel Sloan, Wm. H. Robertson, Stephen P. Nash, Richard W. Gilder, Thomas Hogg, Nelson Smith, Samuel W. Fairchild, Robert Maclay, Wm. H. S. Wood, George M. Olcutt, Chas. F. Cox, Jas. R. Pitcher, Percy R. Pyne, and such persons as are now, or may hereafter be, associated with them, and their successors, are hereby constituted and created a body corporate by the name of the New York Botanical Garden, to be located in the city of New York, for the purpose of establishing and maintaining a Botanical Garden and Museum and Arboretum therein; for the collection and culture of plants, flowers, shrubs and trees; the advancement of botanical science and knowledge, and the prosecution of original researches therein and in kindred subjects; for affording instruction in the same; for the prosecution and exhibition of ornamental and decorative horticulture and gardening; and for the entertainment, recreation, and instruction of the people.

New York Botanic Garden.

"SEC. 2. Said corporation shall have all such corporate powers, and may take and hold by gift, grant, or devise all such real and personal property as may be necessary and proper for carrying out the purposes aforesaid, and for the endowment of the same, or any branch thereof, by adequate funds therefor.

"SEC. 3. Said corporation may adopt a constitution and by-laws; make rules and regulations for the transaction of its business, the admission, suspension and expulsion of the associate members of said corporation, and for the number, election, terms, and duties of its officers, subject to the provisions of this act; and may, from time to time, alter or modify its constitution, by-laws, rules and regulations, and shall be subject to the provisions of Title 3 of Chapter 18 of the first part of the Revised Statutes.

"SEC. 4. The affairs of the said corporation shall be managed and controlled by a Board of Managers as follows: The president of Columbia College, the professors of botany, of geology, and of chemistry therein, the president of the Torrey Botanical Club, and the president of the Board of Education of the city of New York, and their successors in office, shall be *ex officio* members of said corporation and of the Board of Managers, and shall have the management and control of the scientific and educational departments of said corporation and the appointment of the Director-in-Chief of said institution, who shall appoint his first assistant and the chief gardener, and be responsible for the general scientific conduct of the institution.

"All other business and affairs of the corporation, including its financial management, shall be under the control of the whole Board of Managers, which shall consist of the aforesaid *ex officio* members and of the mayor of the city of New York, the president of the Board of Commissioners of the Department of Public Parks, and of at least nine other managers to be elected by the members of the corporation.

"The first election shall be by ballot, and held on a written notice of ten days, addressed by mail to each of the above-named incorporators, stating the time and place of election, and signed by at least five incorporators. Three of the managers so elected shall hold office for one year, three for two years, and three for three years. The term of office of the managers elected after the first election, save those elected to fill vacancies in unexpired terms, shall be three years; and three managers and such others as may be needed to fill vacancies in unexpired terms shall be elected annually, pursuant to the by-laws of the corporation. The number of elective managers may be increased by vote of the corporation, whose terms and election shall be as above provided.

"The Board of Managers shall elect from their number a President, Secretary, and Treasurer, none of whom, or of the Board of Managers, save the Secretary, shall receive any compensation for his services.

New York Botanic Garden

"Sec. 5. Whenever the said corporation shall have raised, or secured by subscription, a sum sufficient in the judgment of the Board of Commissioners of the Department of Public Parks in the city of New York for successfully establishing and prosecuting the objects aforesaid, not less, however, than $250,000, within five years from the passage of this act, the said Board of Commissioners is hereby authorized and directed to set apart and appropriate, upon such conditions as to the said board may seem expedient, a portion of the Bronx Park, not exceeding 250 acres, for establishing and maintaining therein by the said corporation a Botanical Garden and Museum, including an Herbarium and Arboretum, and for the general purposes stated in the first section of this act. And the said Board of Commissioners is thereupon hereby authorized and directed to construct and equip within the said grounds so allotted, according to plans approved by them and by the said Board of Managers, a suitable fireproof building for such Botanical Museum and Herbarium, with lecture rooms and laboratories for instruction, together with other suitable buildings for the care and culture of tender or other plants, indigenous or exotic, at an aggregate cost not exceeding the annual interest upon the bonds hereinafter authorized to be issued by the city of New York; the use of said buildings upon completion to be transferred to said corporation for the purposes stated in this act.

"And for the purposes of providing means therefor, it shall be the duty of the comptroller of the city of New York, upon being thereto requested by said commissioners, and upon being authorized thereto by the Board of Estimate and Apportionment, to issue and sell at not less than their par value, bonds or stock of the Mayor, Aldermen and Commonalty of the city of New York, in the manner now provided by law, payable from taxation, aggregating the sum $500,000, bearing interest at a rate not exceeding three per cent. per annum, and redeemed within a period of time not longer than 30 years from the date of their issue.

"Sec. 6. The grounds set apart as above provided shall be used for no other purposes than authorized by this act; and no intoxicating liquors shall be sold or allowed thereon. For police purposes, and for the maintenance of proper roads and walks, the said grounds shall remain subject at all times to the control of the said Board of Commissioners of the Department of Parks; but otherwise, after the suitable laying out of the same, and the construction of proper roads and walks therein by the Department of Parks, the said grounds and buildings shall be under the management and control of the said corporation. The said grounds shall be open and free to the public daily, including Sundays, subject to such restrictions only as to hours as the proper care, culture and preservation of the said garden may require; and its educational and scientific privileges shall be open to all alike, male and female, upon such necessary regulations, terms and conditions as shall be prescribed by the managers of those departments."

Legal protection.

Legal control of varieties. The prolonged discussion which ran through the year 1890 upon legal protection to originators or owners of varieties of plants, subsided during the present year.* The only new step taken in the movement towards protecting plantsmen, is the following recommendation of a committee (L. H. Bailey, N. H. Albaugh, S. B. Parsons) of the American Association of Nurserymen, which the association adopted:†

"We are of the opinion that a national register of cultivated plants should be made under the auspices of the Department of Agriculture at Washington. This register should contain the name of the plant, its place of origin, originator, how originated, description, and if possible a drawing or photograph of it. This register would serve as a record simply, and would in no sense constitute a 'protection right' or 'patent right' to the originator or introducer. It would serve for a reference in all doubtful or disputed cases, and would be a recognition to the originator; and it would afford a distinct step in advance in the study of systematic horticulture.

"As a means of distinct protection, we advise that all introducers use a trade-mark, which is now held by the patent office to constitute a legal protection."

Nomenclature.

Nomenclature. Reform in names of horticultural varieties is gaining ground perceptibly in all directions. The most gratifying feature of this progress concerns the nomenclature of kitchen-garden vegetables. It will be remembered that a committee from the horticulturists of the experiment stations formulated a set of rules in 1889 for the revision of the nomenclature of vegetables, and the committee also published a catalogue of all varieties sold in American markets that year,‡

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*For a full history and discussion of this subject, see Annals for 1890, pp. 112–129.
†Proc. Am. Assoc. Nurserymen, 1891, 129.
‡Annals for 1889, 106.

with a revision of the names. The labor was undertaken with a full knowledge of its difficulties and of the impossibility of arriving at safe conclusions in all cases; and it was expected that the work should be simply preliminary to a more thorough study of the subject at some future time. In the main, the effort of this committee has met the approval of the seedsmen and writers of the country, and it is but fair to the dealers to say that the experimenters have not pushed the reform. The rules were endorsed by the American Seed Trade Association at its last meeting, and a committee was created for the purpose of fully considering the whole question of nomenclature. Some seedsmen are adopting the rules gradually, in such a manner as not to overthrow too suddenly the existing names. One of the clearest advances in this direction is the dropping of the possessives by James M. Thorburn & Co.: *e. g.*, Thorburn Everbearing cucumber, instead of Thorburn's Everbearing.

Nomenclature.

The work of the committee on nomenclature of the Society of American Florists really belongs to the subject of synonymy, as was pointed out last year.* There is necessity for a specific code concerning the form of the name of varieties of ornamental plants, and if the florists' committee were to undertake this labor with the same energy with which it has prosecuted the subject of synonymy, great progress would soon be made in the application of "brevity, accuracy and good taste" to the names of flowers. The committee is called upon, of course, to decide upon the proper form of the scientific name of the species, but specific and generic names already proceed upon recognized rules, and the determination of them is a botanical rather than a horticultural question. The florists' committee on synonymy is rendering the cause of revised nomenclature great aid, however, as any one will at once observe upon reading its last report,† and it is giving profound moral support to the popular demand for ingenuous catalogue-making.

Synonymy.

Other discussions. Other important general movements of the year are the continued discussions upon country roads, the agitation of rural free mail-delivery systems, and the prosecution of the statistical elaborations of the eleventh census.‡

Roads, etc.

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*ANNALS for 1890, 129.
†Proc. Soc. Am. Flor. vii. 84.
‡For a full outline of the census investigation of pomological questions, see paper on the subject before the American Pomological Society, by Mortimer Whitehead.

The transfer of the Weather Bureau to the Department of Agriculture (July 1, 1891) is also an important event to the horticulturist, because the movement promises to result in a more minute study of the particular requirements of the cultivator. "The study of climate has, in general, been prosecuted by European meteorologists to an extent and to a degree of refinement that is not yet attained in America, and perhaps scarcely appreciated by us. Thus we speak of the climate of a state, whereas we should speak of the climates within the state and of the climate of a special farm or even of a small field, because each individual plant prospers or languishes according as the temperature and moisture of its own locality is favorable or not. * * * The demands of agricultural climatology are very different from those of dynamic meteorology or the study and prediction of daily weather."*

Weather Bureau.

There has been a revival of interest upon the relation of electricity to the growth and development of plants, particularly abroad, and one bulletin report upon the subject has been made in this country.† Researches upon the influence of electric light upon vegetation have also been published from Cornell University,‡ and these possess added interest now that the electric light has been advised as one of the means of mitigating the effects of London and other city fogs.§

Effects of fog upon plants. One of the unique and important investigations of the year is that undertaken by Professor F. W. Oliver, of Kew, for the Royal Horticultural Society, upon the effects of urban fogs upon plants. A grant of £100 was made by the government for this purpose in 1890, and this is the more interesting since it appears to be the "very first instance," according to the *Gardeners' Chronicle*, "in which a grant of public money has been made for any purely horticultural purpose" in that country. A preliminary report was made to the Royal Society, March 24, 1891. It finds that pure country fogs or mists exert no injurious influence on plants aside from lessening the amount of light which they receive. The urban fogs, especially those of large manufacturing cities, contain smoke and other impurities. The most injurious in-

Fog.

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*Mark W. Harrington, chief of Weather Bureau, in special rep. 1891, 25.

†Bull. 16, Hatch, Mass. Exp. Sta.

‡Bull. 30, Cornell Exp. Sta.

§The student of the relations of electricity to plants should consult Dr. Ewald Wollny's Anwendung der Elektricität bei der Pflanzenkultur, Munich, 1883.

gredient of these smoke-fogs appears to be sulphuric acid. These fogs injure plants, therefore, both by reducing the light and "in the formation of actual corrosions of portions of the leaf-surface." The fogs injure both buds and leaves, causing them to fall, and they sometimes destroy outright tender seedlings of cucurbits, tomatoes and some other plants. The chemical composition of one sample of the fog deposit from a greenhouse roof was as follows: About 40 per cent. mineral matter, 36 per cent. carbon, and 15 per cent. of hydrocarbons. There was 2 to 3 per cent. of metallic iron in minute particles. Sulphuric acid was present to nearly 5 per cent. and hydrochloric acid 1½ per cent. The report suggests several Fog. remedial measures. In foggy times in cities the temperature should be kept low and the roots should be watered sparingly. "Everything should be done to tax the vegetative organs of a plant to the least possible extent, when any of the vital functions are interfered with, as in dull, foggy weather." There is some reason to believe that moisture upon the leaves lessens the injury from the acid. It is possible that some practicable way may be found of straining or filtering foggy air upon its entrance into the house, or some absorbent may be found which shall render the fog innocuous. It is also thought that the electric light can be used to advantage in foggy weather. The most promising remedy, in the opinion of Professor Oliver, is to keep the fog out of the house. "It is to be hoped some metropolitan grower will pluckily face the situation and construct a range for winter use, which can be made at will absolutely fog-proof, with close glazing, triple doors and padded ventilators."

PART II.

SPECIAL ANNALS.

§ 1. *Introductions of 1891.**

A LIST OF THE FRUITS, VEGETABLES AND ORNAMENTAL PLANTS INTRODUCED INTO AMERICAN TRADE DURING THE YEAR.

There were 884 species and varieties of plants introduced into American trade during the year, as registered in the following pages. In 1889 there were 434 plants introduced, and in 1890 there were 575. The increase in the registry for 1891 is in part due to the more thorough and complete record which each year enables me to make, but it is chiefly due to the greater activity in horticultural trade during the year. The importations of roses were very large, and introductions are increasing in the leading ornamentals, as chrysanthemums, carnations, geraniums, and cannas, and also in native plants. The study of these lists from year to year affords an instructive estimate of the vitality and tendencies of our horticulture. Of the 884 plants first offered for public sale in North America in 1891, 668 are ornamental plants, 108 fruit-plants, and 108 vegetables. Including the pecans, 185 native species and varieties heretofore unknown to cultivation or but sparingly disseminated were put upon the market*; of these, 24 are introduced as fruit-plants, but 12 others which are introduced as ornamentals have edible fruit.

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* In the compilation of this list there has been no attempt to determine synonymy or to revise names. The list is simply a chronicle of the trade. The descriptions of the plants are gleaned from the catalogues, and although every care has been exercised in their selection, I can in no case vouch for their accuracy.

Some of the varieties were first sold in the fall of 1890 for planting the following spring, and various ornamental plants were introduced throughout the late fall and winter; all these are recorded as appearing in 1890–1.

Aberia caffra. *Reasoner Bros.*
South Africa.

Abies bracteata. *Orcutt.**
A tall slender pyramidal tree of the Pacific Coast, reaching 100–150 feet in height.

— magnifica. *Orcutt.*
The Red Fir of the Pacific Coast; reaches 200 feet.

Abronia villosa. *Orcutt.*
A trailing Californian plant, producing bright rose-purple flowers.

Abutilon. Future Fame. *Dreer.*
Very deep rose shaded with crimson.

— striata splendida. *Dreer.*
Flowers bright orange, striped with rich crimson.

— The Premier. *Dreer.*
Deep rosy purple.

Acacia. Fourteen new species from Australia and the gardens of Europe. *Reasoner Bros.*

Acanthomintha ilicifolia. *Orcutt.*
A mint-like annual, a span high, of Southern California. Flowers white and purple.

Actinolepis (or Baeria) coronaria. *Orcutt.*
A low annual composite, with yellow flowers California.

Adenostoma fasciculatum, and A. sparsifolium. *Orcutt.*
Evergreen Californian shrubs, belonging to the rose family. The former is the *Chamisal.*

Adiantum Lambertianum. *Saul.*

— monochlamys. *U. S. Nur.*
Finely denticulated pinnules

Agapanthus umbellatus var. albus. *Reasoner Bros.*
Africa.

— — flore-pleno. *Vick.*
Dark blue double flowers. Cape of Good Hope.

Agave deserti, A. Pringlei, A. Palmeri, A. Parryi and A. Schottii. *Orcutt.*
Agave from California and Arizona.

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*The plants catalogued by Mr. Orcutt are not all in cultivation, but he offers them for sale and they must therefore be considered as introductions.

Agave. Eight new kinds from N. Africa. *Reasoner Bros.*

Aletris aurea. *H. P. Kelsey.*

E. States.

Allium falcifolium. *Orcutt.*

Flowers rose-color. California.

— fimbriatum. *Orcutt.*

Scape 3 inches high, bearing 20–30 rose-purple flowers. S. California. *Lavina* of the Mexicans.

Alnus viridis. *H. P. Kelsey. Gillett & Horsford.*

N. States.

Aloe. Fifteen garden sorts from S. Europe and N. Africa. *Reasoner Bros.*

Alternanthera rosea nana. *D. R. Woods & Co., New Brighton, Pa.*

Of dense compact growth, so regular that it rarely requires clipping. In color it is entirely distinct from all others, being bright pink or rose. The young foliage takes on this color very early in the season and maintains it until destroyed by frost, presenting a strong and beautiful contrast with others of its class.

Amsonia ciliata. *Harlan P. Kelsey, N. C.*

Native herbaceous perennial, 2 to 3 ft., flowers pale blue in terminal racemes.

Ananassa Cochin-Chinensis. *U. S. Nur.*

Distinct variety from the variegated Pineapple, differing from it in color.

Anemone Virginiana. *H. P. Kelsey.*

E. States.

Angelica Curtisii. *H. P. Kelsey.*

E. States.

Anthurium Clarkianum. *U. S. Nur.*

Leaves large and broad; flower-spathe of clear salmon-rose color, in shape resembling *A. Andreanum.*

— Raynoldianum. *U. S. Nur. Saul.*

Hybrid between *A. Ferrierense and Andreanum.* Leaves and color of the spathe are that of former, while shape is same as *A. Andreanum* much enlarged.

Antirrhinum Orcuttianum. *Orcutt.*

A Californian snap-dragon. Tall, annual; flowers white or violet. Discovered in 1882.

Apple. American Blush. *Green's Nur. Co.*

Ground color yellowish, overlaid with splashes and streaks of bright crimson. Flesh tender, juicy, aromatic. Mid-winter.

— Garfield. *J. V. Cotta.*

Introduced in fall of 1890, and in 1891.

— Jackson. *Emerson, Delaware.*

— Johnson's Seedling. *Barnes.*

Apple. Lehigh. *Johnson, Pa.*

— Orchard Red. *Stark Bros.*

— Palouse. *Colfax Nur., Washington.*

— Peerless. *Brand.*

— Rutledge. *T. V. Munson, Texas.*

Fruit large and handsome, richly striped, resembling Bradford's Best, but of better quality. Ripens soon after Ben Davis. The original tree is owned by Frank Rutledge, Travis Co., Texas.

— Wisconsin Spy. *Barnes.*

[Apples, 10 varieties.]

Aquilegia Stuarti. *Gardiner.*

A cross between Grigor's Glandulosa and *Aquilegia Witmani*, by Dr. Stuart, Scotland. From the flower thus fertilized a pod was gathered and the seed sown at once. Seven plants lived to be planted out in the autumn in a sheltered border. These all bore flowers identically the same, the top blooms measuring 4 inches and more across. It was named *A. Stuarti* by Professor Balfour. The following points of superiority over *A. glandulosa* are given for this hybrid: it is much larger, more free-flowering, and far more refined in form. The much-admired *Glandulosa* of Grigor is a very shy flower. In the new form raised by Dr. Stuart, this defect is to a large extent removed.

Aralia Cashmeriana. *Saul.*

Arbutus Menziesii. *Orcutt.*

The Madroña of California. Flowers white. Sometimes becomes 100 feet high.

Arctostaphylos bicolor, A. Manzanita and A. Pringlei. *Orcutt.*

Pacific Coast species. The second one is the Manzanita tree.

Argemone hispida. *Orcutt.*

Thistle Poppy of California. Annual, 3–6 feet high, with white flowers 4 or 5 inches in diameter.

Asclepias phytolaccoides. *H. P. Kelsey.*

E. States.

Asparagus Commoriensis. *U. S. Nur.*

Much finer and more robust-growing than *A. plumosus*, which species it somewhat resembles.

— decumbens. *U. S. Nur.*

— retrofractus arboreus. *Saul.*

Aspidium amabile. *U. S. Nur.*

Dark green shining fronds; very hardy.

— viridescens. *U. S. Nur.*

Large-growing species with bipinnate fronds of grass-green color. The pinnæ are crenated, giving the plant a graceful appearance.

Aster, Apple-Blossom. *Henderson.*

Belongs to the Jewel type. Ball-shaped, delicate shell-pink.

Aster. Deep Rose. *Henderson.*
Jewel type, ball-shaped, dark rose.
— punicens var. lævicaulis. *H. P. Kelsey.*
E. States.

Baeria gracilis. *Orcutt.*
A Californian composite, a span or so high, with yellow heads.

Baptisia simplicifolia. *H. P. Kelsey.*
E. States.

Bean, Boston Market. *Salzer.*
— Childs Horticultural Lima. *Childs.*
Said to be a cross between the common Lima and Horticultural.
— Early Warwick. *Henderson.*
An extra-early green bush-bean.
— Extra Early Refugee. *Henderson.*
Like the old Refugee except that it is two weeks earlier.
— Gold Drop. *D. C. Hicks.*
— Golden Champion. *Henderson.*
A very early wax pole-bean, with yellow pods, resembling the Yosemite Wax.
— Hopkins' Improved Valentine. *Barnard.*
— Jackson's Wonder. *M. W. Johnson & Co.*
— Old Homestead. *Henderson.*
An early green pole variety, stringless, the pods resembling the Refugee Bush bean.
— Queen Wax. *D. C. Hicks.*
— Sunshine Wax Pole. *Burpee.*
Pods bright yellow, borne in clusters of three or four, 6 to 8 inches long, perfectly straight, stringless.
— The Shah (The Black Shah). *Thorburn.*
Moderately early dwarf snap-bean, producing a large number of remarkably long pods, sometimes eight inches in length and very straight, slender and almost cylindrical. Seed long and black.
[Beans, 12 varieties.]

Beet, Black Queen. *Childs.*
Evidently the same as Reine des Noires.
— Early York. *Salzer.*
An early strain of turnip beet.
— Reine des Noires. *Henderson.*
Desirable both for ornament and the table. Foliage very erect and dark blood-red. Introduced by Childs as Black Queen.

Begonia, Annie Dorner. *Hill.*
A free bushy grower; very elegant notched leaves, deeply pointed. The coloring is very rich, the dark center and edge being velvety in texture, enclosing a silky, pointed zone.

Begonia, Arthur Malet. *U. S. Nur.*

Fine variety in same style as *B. metallica*, but with leaves of rich crushed strawberry color.

— Bertha McGregor. *Hill.*

Leaf 9 x 6 inches, long-pointed and with six deep notches. A free, strong grower, producing foliage in abundance; the center of leaf is small, dark and palm-shaped; the body of leaf is solid silver outlined with bronze.

— Cuprea. *Dealers.*

A seedling from *Metallica*, with beautiful velvety leaves of dark green. A strong, rapid grower.

— Dr. James. *Hill.*

Six-pointed leaf with ribbed center and edge of red; body of leaf silky olive green with zone of silver dots. A fine grower, and the young foliage is very rich and showy. Stems smooth, red.

— Flora Hill. *Hill.*

A beautiful grower, with deeply notched leaves of great size; color of leaf a frosted steel, with distinct sheen of plum color; ribs and edges dark green shading into reddish plum.

— Haageana. *Saul.*

— John Chambers. *Hill.*

Belongs to the upright-growing section, although the foliage is of large size though fine in texture; the leaf is broad, but cut into five elegant, deep points; the entire body of leaf is like nickel-plate, while the pointed border is soft reddish plum color, dotted in silver.

— Le Compte. *Dealers.*

Leaf of medium size, of pointed Rex form; the color is very dark velvety green just edged in very bright silver in the young leaves; the matured leaves are almost completely covered with silvery blotches on a dark background; it is a fine grower, somewhat in the style of Marquis Peralta. A cross between *Subpeltata* and *Rex*.

— Louise Closson. *Dealers.*

The brightest of all the rosy-leaved Rex, of which Chretien was the forerunner; the texture is very full and crape-like, while the zone is a bright rosy purple, of high metallic luster.

— Lucie Closson. *U. S. Nur.*

Richly colored leaves.

— Mrs. A. G. Shepherd. *Hill.*

Broad, nicely lobed leaves, with center and edge of bronzy red: body of leaf like light, changeable green silk.

— Mrs. E. Bonner. *Hill.*

Fine upright grower, regularly but not deeply notched. The leaf is light, silvery green, ribbed and edged with reddish metallic bronze. Beautiful habit.

— Perle Humfeld. *Hill.*

One of the handsomest begonias ever sent out; shows from six to eight deep points, arranged in very elegant form. The color is velvety green of various shades, broadly zoned with silvery spots.

Begonia, Pictaviense. *Dealers.*

(*Scharffii* × *Metallica.*) The leaves are intermediate between the two parents, both in size and form ; the under side is a rich purplish red, the veinings very prominent, while the face of the leaf is a fine bronzy green with dots of silver. The flowers are borne in large clusters well above the leaves.

— President Carnot. *Dealers.*

Cross of Olbia and Rubra.

— Sieberiana semperflorens. *Dealers.*

The most beautiful variety of all the Semperflorens group; the plant blooms continually, and the clusters of flowers are very large, well out beyond the foliage, and of the most beautiful combinations of pale pink and soft rose color ; the flowers are very large and of heavy waxen texture.

— Souvenir F. Gaulain. *Dealers.*

Cross of Olbia and Rubra.

— Sterling. *Hill.*

A broad leaf, three-pointed and the upper part lobed. A nice upright grower with smooth stems ; the entire leaf is of pale silvery green, of frosted luster, broken only by pink ribs narrowly banded in green and narrowly edged red.

— Triomphe de Lemoine. *Dealers.*

A cross between *Socotrana* and *Roezlii.* Makes a beautiful, compact plant of bright green foliage. The leaves are large and obliquely rounded. Florets large and united into large panicles of bloom, of a bright, clear rose color. Blooms from January to May in the greatest abundance. Should be bedded out in the summer to get best results.

— Velutina. *Dealers.*

A seedling of *Metallica,* with much larger leaves, and of velvety texture. A strong, fine grower, which promises to surpass the parent.

[Begonias, 21 varieties.]

Blackberry, Lovett's Best. *Lovett Co.*

Chance seedling found by Moses Jewett in Atlantic Co., N. J.

Blechnum nitidum. *Reasoner Bros.*

Queensland.

Bloomeria Clevelandi. *Orcutt.*

A yellow-flowered liliaceous plant, 6 inches high, from S. California.

Borecole, Scotch Curled, Bonaccord strain. *Gardiner.*

This is a variety extensively grown in Aberdeenshire, Scotland, where it reaches great perfection. It is a very distinct sort, half dwarf, and very curly.

Brodiæa Orcuttii, B. (or Triteleia) hyacinthina and B. peduncularis. *Orcutt.*

Liliaceous plants from California. The first has royal purple flowers, the second milky white, and the last glossy purple.

Brunella vulgaris. *H. P. Kelsey.*

E. States. Common.

Brussels Sprouts, Craigo. *Gardiner.*

Originated by Mr. Muirden, of Scotland. Very early, of dwarf, robust growth, and covered the entire length of the stem with compact sprouts of very superior flavor. The sprouts are exceedingly hard-heading, and cook tender and delicious.

Buffalo-berry (*Shepherdia argentea*). *L. E. R. Lambrigger, Cold Spring Seed-Farm, Wyoming.*

Offered first in the fall of 1890 (see p. 52, also *Western Garden*, i. 52, 132). It is a tree-like shrub, attaining a height of 10 feet when well-grown, of compact, symmetrical habit. Leaves numerous and silvery white. Bears rich clusters of crimson fruit from early summer through the fall and entire winter. The fruit is round, smooth and glossy, resembling in size, form and color the cultivated red currant. The fruit forms in clusters to the very tips of the branches. It is a constant and prolific bearer, entirely hardy, having endured 60 degrees below zero, and borne fruit the following summer. Before being touched by frost the fruit is very acid ; freezing subdues it until it becomes so rich and palatable that as a dessert fruit in midwinter it is without a rival, while for jellies it is said by epicures to equal in flavor the famous Guava jellies.

Cabbage, Early Yellow Dutch Savoy. *Gregory.*

Imported.

— Nonesuch. *Brill.*

— Rothselburg. *Gregory.*

A German drumhead with a very short stump and large head in proportion to the size of the plant. Second early.

— Volunteer. *Rawson.*

Very early summer cabbage.

— World Beater. *Brill.*

Calochortus aureus, C. Leichtlinii, C. Palmeri and C. venustus var. purpurasceus. *Orcutt.*

These are four types of the Mariposa Tulips of the Pacific Coast.

— Kennedyi. *Gillett & Horsford.*

Pacific States.

— nitidus and C. uniflorus. *Orcutt.*

Types of the Star Tulip or Celestial Tulip section of the genus. Californian.

Camassia Leichtlinii. *Gillett & Horsford.*

N. W. States.

Campanula Americana and C. divaricata. *H. P. Kelsey.*

E. States.

Canavalia gladiata. *Reasoner Bros.*

Natal, Africa.

Candytuft, Dobbie's White Spiral. *Gardiner.*

Raised by Dobbie, Scotland.

Canna, Eva. *Henderson.*

About 2 ft.; flowers bright canary-yellow with scarlet spots. Seedling by Henderson.

— Madeline. *Henderson.*

Compact, 2 ft.; flowers chrome-yellow, irregularly marked with deep scarlet. Seedling by Henderson.

— Star of 1891. *Childs.*

The habit is very dwarf, but with full fine foliage, and it has a persistent habit of throwing up fresh sprouts from the base. Every sprout produces a flower-spike, which in its turn becomes many-branched, each branch bearing from 12 to 17 blossoms, each blossom 4 to 5 inches wide, and each petal 1½ inches broad. The color of the flowers is glowing orange-scarlet, faintly banded with golden yellow, and the plants, from small to large specimens, are perpetually in bloom. The plant was raised from Crozy Prize Seed by a Mr. Catlin of Virginia. He sent it to Wm. Falconer, who grew it in a pot over winter, and its size, profusion and brillancy of bloom at once attracted attention. Mr. Childs bought the stock.

— Sunset. *Henderson.*

Flowers light orange, large, in large spikes; foliage musa-like in appearance and texture. Seedling by Henderson.

— Unique. *Henderson.*

Flowers rich golden yellow, the center of the petals marked with bright crimson. Originated with Henderon.

— The following 36 varieties of Crozy, by *various dealers.*

Avenier. An excellent variety, with large spikes of bright vermilion flowers; foliage green. 5 feet.

Baron de Sandrans. Foliage bright green; flowers large, of a bright orange-scarlet, suffused with vermilion, golden yellow edge. 3½ feet.

Boucharlet Aine. Flowers very large, scarlet, overlaid with salmon; foliage green. 5 feet.

Chevallier Besson. Flowers very large, of a rich orange-scarlet overlaid with vermilion; the foliage dark green with purple edge. 6 feet.

Comte Horace de Choiseaul. Flowers of a deep crimson of large size; foliage deep green. 4½ feet.

Doyen Jean Sisley. Flowers large, of a clear magenta overlaid with carmine; foliage bright bronzy purple. 3½ feet.

Duc de Montenard.

Duchesse de Montenard. Very large flowers of a bright yellow spotted with red; foliage green. 4½ feet.

E. Chevreul. Flowers of a peculiar shade of brownish red, edged and striped with pale yellow, entirely distinct; foliage green. 4½ feet.

Edward Michel.

Erocadero.

François Crozy. Flowers of medium size, of a deep shade of salmon, edged with bright yellow; foliage deep green. 3 feet.

Canna (Crozy), François Maire. Flowers orange-yellow, minutely spotted with cinnamon-red; foliage bright green. 3½ feet.

Frederic Benary. Flowers large, of an intense rich crimson; foliage deep green. 4 feet.

Gen. Baron Berge. Foliage deep green; flowers large, of an intense rich crimson. 3 feet.

Guy de Oultremont.

Henri L. de Vilmorin. An entirely distinct variety and of a most pleasing color; the center of the flower is of a brownish red, shading off at the outer edge of the flower to a bright yellow, the two colors contrasting most beautifully; foliage pea-green. 4 feet.

Ingénieur Alphand. Flowers large, of a bright vermilions-carlet; foliage deep bronzy purple. 4 feet.

Kettlerii. Flowers of medium size, of a rich vermilion-scarlet shaded with salmon; green foliage. 5 feet.

La Guill. Flowers very large, of a beautiful rich salmon; foliage deep green. 5½ feet.

Legionaire.

Madame Crozy.

Mademoiselle de Cruillon.

Maurice Rivoire. Large flowers of a vermilion-scarlet; foliage bronzy purple. 5 feet.

Mr. Cleveland. Flowers very large, of a rich orange-scarlet, overlaid with deep crimson; foliage deep green. 5 feet.

Mr. Laforcade. Flowers of large size, of a deep salmon, shaded brick-red; foliage deep bronzy purple. 3 feet.

M. Lefebvre.

Perfection. Bright golden yellow flowers, minutely spotted with cinnamon-red; foliage green. 4½ feet.

Pierette de Biorlet. Flowers large, deep lemon, striped with cinnamon-red; foliage green. 3 feet.

President Carnot. Very large flowers, scarlet overlaid with vermilion; foliage bronzy purple. 4 feet.

President Hardy.

Princesse Brancovan.

Secrétaire Nicolas.

The Garden.

Thos. S. Ware. Flowers large, deep salmon, overlaid with scarlet; foliage green. 3 feet.

Vitticeulteur Gaillard. Flowers of very large size, of a bright vermilion-scarlet; foliage green. 6 feet.

[Cannas, 41 varieties.]

Carnation, Alexander. *Various dealers.*

— American Flag. *Henderson.*

Sport from Portia. Originated with G. Bergmans, Flatbush, Long Island. Striped scarlet and white.

— Angelus. *W. R. Shelmire, Avondale, Pa.*

Chester Pride × Grace Wilder. Semi-double, fine shade of pink, but darker than Wilder. Flowers on long stems and about 2½ inches in diameter.

Carnation, Annie Wiegand. *Hill.*

An improved Grace Wilder, being quite similar in color of flower and foliage, but a strong, long-stemmed grower, both early and free in bloom; not so novel in form as Lonsdale, but from its perfection of growth and color, together with its great freedom of bloom, we predict that it will be grown by every raiser of cut-flowers. (Dorner.)

— Aurora. *Edward Swayne.*

— Beatrice. *W. R. Shelmire, Avondale, Pa.*

Mrs. McKinsey × Chester Pride. Light salmon. Flowers good size and shape, semi-double.

— Brutus. *W. R. Shelmire, Avondale, Pa*

Red sport of Cæsar.

— Cæsar. *W. R. Shelmire, Avondale, Pa.*

E. G. Hill × Andalusia. Markings much like Nellie Bly, but flowers very double, round and large, on stiff, long stems.

— Cherry Lips. *Hill.*

Very deep, bright pink; broad foliage and long stems; double and free. (Dorner.)

— Christmas. *Chas. T. Starr.*

— Creole. *Hill.*

About the color of rose Jean Liabaud, and showing a similar heavy velvety texture; petals slightly notched and shelled, and occasionally lightly flaked carmine; a good grower, with very long stems and healthy, fine habit; a good velvety maroon is in great demand, especially one with strong stem, as in the present variety. (Dorner.)

— Daybreak. *W. P. Simmons & Co.*

Large size and perfectly double, clear bright flesh tint without shading.

— Dorothy. *W. R. Shelmire, Avondale, Pa.*

Chester Pride × Grace Wilder. Plant more dwarf than Angelus and color rather darker. Flowers 2½ inches or more in diameter and finely fringed. Full double.

— Edelweiss. *W. R. Shelmire, Avondale, Pa.*

White sport of Chester Pride.

— Edwin Lonsdale. *Hill.*

A perfect pink carnation; under even ordinary culture the flower is three inches across; the texture is very heavy, the petals are not fringed, but somewhat of camellia form; the color is the most exquisite shade of light pink; it is a very strong grower, and the flower-stems can be cut 10 to 12 inches long. (Dorner.)

— Excellent. *Various dealers.*

— Fire Ball. *Various dealers.*

— Fred. Creighton. *Geo. Creighton and dealers.*

Carnation, Fred Dorner. *Hill.*

Bright, deep scarlet, a most perfect color, soft yet brilliant; the flower is of the largest size, with outer petals of extra weight; perfectly double; center petals upright; nicely fringed and sweet. It is a strong, free grower, and very abundant in bloom; the grass is heavy and abundant. (Dorner.)

— General Custer. *W. R. Shelmire, Avondale, Pa.*

E. G. Hill × Andalusia. Variegated red and white, the markings red-dotted, red predominating.

— Golden Triumph. *Lombard.*

— Grace Darling. *Chambers.*

— Little Gem. *Various dealers.*

— Lizzie McGowan. *John McGowan and various dealers.*

Cross between Peter Henderson and Hinze's White. Flowers large and full, white; smaller than Hinze's White.

— Louise Porch. *John McGowan.*

— Nellie Bly. *W. R. Shelmire, Avondale, Pa.*

E. G. Hill × Andalusia. Flowers medium to large, semi-double; variegated red and white in narrow stripes, beautifully fringed.

— Nellie Lewis. *Vick.*

Sport from J. J. Harrison; clear pink.

— Pearl. *C. J. Pennock, Kennett Square, Pa.*

White, occasionally rosy blush, very large, frequently from 3 to 3½ inches across; a good bloomer with rarely any tendency to burst; stem long and stiff.

— Puritan. *Wood Bros.*

— Red Cross. *Hill.*

Very bright, light scarlet, of glistening texture; a fine grower. (Dorner.)

— Thomas Cartledge. *Edward Swayne.*

— White Wings. *Hill.*

Purest white; texture heavy and glistening; petals lightly fringed; a little beyond the average in size, and produced in the greatest profusion; it is a strong, free grower and produces very long flower-stems; the flower has a very pure waxen appearence. (Dorner.)

[Carnations, 32 varieties.]

Carpenteria Californica. *Orcutt.*

A fragrant white-flowered shrub of the saxifrage family.

Carrot, D. M. Ferry & Co. Improved Short White. *Ferry.*

— New Short White. *Steele Bros.*

— Salzer's Midsummer. *Salzer.*

Castilleia affinis and C. foliolosa. *Orcutt.*

The former an annual, the latter a perennial; both characterized by colored bracts. Californian.

Castor Beans, Carman's Hybrids. *Thorburn.*

Two years ago Mr. Carman crossed the several so-called Ricinus, known in catalogues as Cambodgensis, Africanus, Gibsonii, Sanguineus, etc. Many of the resulting hybrids are remarkable in several respects. Some of them grow tall and branching as Sanguineus, with variously colored stems, and foliage even darker than that of either Gibsonii or Cambodgensis. Others are dwarfs, growing only to the height of two or three feet, with leaves of lustrous metallic shades, varying from a copper-red to dark bronze.

Cauliflower, Early Perfection. *Gregory.*

An early and productive sort.

— Long Island Beauty. *Brill.*

Ceanothus divaricatus, C. hirsutus and C. Orcuttii. *Orcutt.*

"Wild lilacs" of California. Shrubs.

— ovatus. *Gillett & Horsford.*

N. E. States.

Celery, Salzer's Self-Blancher. *Salzer.*

Celtis Kraussiana. *Reasoner Bros.*

Natal, South Africa.

Chænactis artimisiæfolia and C. tenuifolia. *Orcutt.*

Small compositous annuals, with whitish and lemon-yellow flowers, respectively. Californian.

Chelone glabra var. alba. *H. P. Kelsey.*

E. States.

Chestnut, Hathaway. *Lovett.*

A large native nut, originating with Benjamin Hathaway, Little Prairie Ronde, Michigan. 1890-1.

Chilopsis saligna. *Orcutt.*

Desert Willow, from California. One of the Bignoniaceæ.

Chlorogalum angustifolium and C. parviflorum. *Orcutt.*

Small lilaceous Californian plants.

Chrysanthemum, Alcazar. *Nathan Smith & Son.*

Incurved Japanese Petals bronze-red with reverse old gold. Flowers double, on stiff stems.

— Andrew McNally. *Geo. W. Miller, Chicago.*

The flowers are very full and large, crimson-scarlet with reverse of old gold. On opening, the flower is slightly incurved, but gradually the petals assume a horizontal position, when the texture shows a beautiful velvety appearance. Strong grower, long-stemmed. Cross between Mrs. Weeeler and Cullingfordii. One of the "World's Fair Set."

— Anna Dorner. *Fred Dorner and dealers.*

A full. fine bold flower, with outer petals striped and shaded rich carmine; center cream-white.

— Anna M. Weybrecht. *T. H. Spaulding and dealers.*

A magnificent pure white variety; petals broad and solid. A strong, vigorous grower.

Chrysanthemum, Aristine Anderson. *Nathan Smith & Son.*

Much like Mrs. Mary Morgan, but larger, and deeper pink.

— Astoria. *U. S. Nur.*

Stout grower, perfectly double, petals irregularly twisted in every direction; good substance; deep rose-pink color.

— Atlanta. *U. S. Nur.*

Fine high flower with loose, somewhat twisted petals of good substance; beautiful delicate mauve color.

— August Swanson (Black Beauty). *Hill.*

Bright scarlet lined with bright gold. It is the most brilliant of the Wheeler type, rather dwarf in habit, and very free in bloom. A magnificent exhibition pot variety.

— Beacon. *Vaughan.*

Magnificent full double creamy white flower with strong stems. The outer row of petals are tubular and reflexed, while those nearer the center are incurved, with broad convex tips. The color is very delicate and pleasing, (Fewkes.)

— Bride of Roses. *Henderson.*

Flowers large, rosy pink. Strong and free. From Japan.

— Cardinal Sunshade. *Childs.*

Flowers single, long-quilled, the petals flattened at the ends and deep cardinal. Very large.

— Catawba. *U. S. Nur.*

Flower with curiously shaped and cut petals. Large and strong-growing; rose and pink color. Single.

— Cesare Costa. *Various dealers.*

Imported.

— Charles Canfield. *T. H. Spaulding and dealers.*

Extra-large and full, double incurving form. A strong, robust growth. Color claret-red, reverse silvery pink.

— Charles Hartwig. *Vaughan.*

A rich deep crimson, brighter than Cullingfordii. One of the very best crimson sorts. (Thorpe.)

— Charles Henderson. *Vaughan.*

Clear yellow, streaked and splashed with old gold and reddish purple, making its center a golden bronze; extremely large and double. Petals flat and many-toothed, shaped like Elkhorn. Plant of strong constitution and very tall grower. (Spaulding.)

— Charles H. Wacker. *Geo. W. Miller, Chicago.*

A good variety for pots, perfecting immense numbers of medium to large flowers; the color is very brilliant scarlet, quite velvety; slightly recurving, with small incurving center of fine golden petals. One of the "World's Fair Set."

— Charles T. Yerkes. *Geo. W. Miller, Chicago.*

Very regular, high incurved form, reminding one of the best Chinese; the color is new in this form, being similar to Mrs. Wheeler, bright scarlet and gold; very profuse in bloom. A clean grower with long stems. A fine cut-flower variety. One of the "World's Fair Set."

Chrysanthemum, Chicopee. *U. S. Nur.*

Very large flower composed of flat petals. Colors are magneta inside, while outer side is fawn color. Single.

— Clancy Lloyd. *T. H. Spaulding, and dealers.*

Delicate flesh-pink, changing to white; of incurving form, with full center, long guard petals extending in a ray around the flower.

— Clara James. *Vaughan.*

White, with pale pink tint; incurving, very large and full, almost globular. (W. K. Harris.)

— Cleopatre. *Various dealers.*

Already a noted variety; very large and pure white, of soft, plumy appearance. Imported.

— Cohasset. *U. S. Nur.*

Semi-double flower, tubular flowers opening at ends; color deep pink on inside, light Naples yellow on outer side and edges of petals.

— Colorado. *U. S. Nur.*

Fine high flower with very broad flat petals. Light chrome-yellow.

— Coronarium imbricatum fl. pl. *Thorburn.*

A double annual chrysanthemum differing most markedly from the old types in the arrangements of its petals, which, instead of lying flat one upon another are vaulted and arranged like tiles. The blooms are globular in shape, very double, and of an intensely glowing golden yellow color. These flowers, which are produced profusely till late in the antumn, are unsurpassed for decorative purposes and preserve their brightness and beauty for about ten days after cutting. German. See *American Garden*, xi. 53. (Jan. 1891).

This is the "Porcupine" of Henderson, introduced this year.

— C. W. De Pauw. *Hill.*

This was produced by the raiser of Widener; it is a very double sort, having long petals arranged in a most perfect form; the color is is a soft pearl-pink with touches of light lavender. It has the appearance of a soft, fluffy pink ball of great size. Will rank with any of the very finest varieties.

— Cyrus H. McCormick. *Geo. W. Miller, Chicago.*

A strong grower, producing long stiff stems. Flowers somewhat like W. H Lincoln in shape, the large number of slender petals being evenly arranged. Dark deep yellow, shaded with bronze-red. Raised by Jamieson of Philadelphia. One of the "World's Fair Set."

— Daisy. *U. S. Nur.*

Fine flower of pure white color, very symmetrical and artistic shape. Single.

— Damon. *Geo. L. Miller, Stockton, O.*

A rich-terra cotta, 3 inches in diameter. Single.

— Dawn. *Henderson.*

Delicate rosy blush, of the largest size. (Said to be the same as V. H. Hallock. See ANNALS for 1889, 99.)

Chrysanthemum, Delaware. *U. S. Nur.*

Large flower, very double, anemone center ; color white, light pale yellow near center. Best anemone variety.

— Dr. Chas. B. Brigham. *U. S. Nur.*

Large full flower, flat petals ; color pure white ; fine grower.

— Eda Prass. *Fred. Dorner and dealers.*

A fine bold recurving flower of great substance and depth ; white, delicately shaded blush. Of great promise.

— Eldorado. *H. Waterer and dealers.*

Incurved, intense yellow. Petals broad, flower large for this type, a good keeper, and stiff-stemmed.

— Elmer D. Smith. *Hill.*

This variety can be made to outrank all others in its diameter and the number of its petals. The foliage is very large and heavy, and dark green ; the color is cardinal-red, of a very rich pleasing shade, faced upon the back of the petals with clear chamois ; comes nearer being a scarlet-maroon than any of the Wheeler type yet sent out. The flower attains a great size even under the most ordinary treatment.

— Emily Dorner. *Hill.*

A rather dwarf grower, but very sturdy ; the flower is nicely incurved, petals broad, and of the richest shade of orange-yellow, touched with crimson. Color extremely rich.

— Emma Dorner. *Fred Dorner and dealers.*

A fine deep violet-pink, in the way of Violet Rose when finely done, but a deeper, purer color. Large ball-shaped flowers of splendid substance.

— Etoile de Lyon. *Various dealers.*

French.

— Evaleen Stein. *Fred Dorner and dealers.*

In the way of Bride, but an improvement on that variety ; delicate white with petals like Elkshorn.

— Ferd. W. Peck, or Gallia. *Geo. W. Miller, Chicago.*

Beautiful rosy pink, petals incurving, while the flower has a beautiful open appearance, though perfectly double to the center. The flowers are large, and produced in great numbers. One of the six varieties which won the $100 premium at Indianapolis. One of the "World's Fair Set."

— Flora Hill. *Hill.*

This is to white "'mums" what Widener is to the yellows. Good size and heavy texture ; outer petals horizontal or slightly recurving, the creamy center perfectly full and incurved.

— Frank Thomson. *Hill.*

Nearly spherical ; petals very broad and heavy, and finely incurving ; nearly white, showing a touch of pearl-pink at the base of the petals. Strong grower.

Chrysanthemum, Fred. S. Winston. *Geo. W. Miller, Chicago.*

A fine variety of beautiful bronzy cardinal color with reverse of Indian red; of the Carnegie type in general, though a free grower and perfecting its flowers at mid-season; rather dwarf than tall. The form of the bloom is absolutely perfect and displays the colors to the best advantage. One of the "World's Fair Set."

— Garden Queen. *Henderson.*

Deep violet; reverse of petals silvery rose.

— George R. Davis. *Geo. W. Miller, Chicago.*

Is an improvement on Crown Prince, in both freedom of growth and bloom. Ox-blood red. One of the "World's Fair Set."

— Golden Plume. *Henderson.*

Drooping petals of rich golden color, with a tuft of feathery petals in the center.

— Innocence. *Fred Dorner and dealers.*

Seedling from Mrs. Hardy; as fine in form, texture and finish as the parent, but without the velvety covering. The purest white found in the entire chrysanthemum family.

— J. C. Vaughan. *Vaughan.*

Richest plum-crimson without any shade of purple. Flowers reflexed; very large, strong, stiff stems. This is really a beautiful and distinctly colored variety. (Thorpe.)

— J. J. Richardson. *Geo. L. Miller, Stockton, O.*

A large, handsome flower, 5 to 6 inches in diameter, with narrow petals slightly quilled at first, and whorled in the center, hiding the disc when flowers are at their best; color, a rich carmine-pink; Japanese type.

— J. Kready. *T. H. Spaulding and dealers.*

Immense flower, in style and color of Mrs. Frank Thomson, but larger and more double.

— John Dyer. *U. S. Nur.*

Good strong grower, broad petals of extra substance, perfectly double; color chrome-yellow striped entire length of petals with fine red lines.

— John Firth. *T. H. Spaulding and dealers.*

A good exhibition plant; petals cup-shaped. Finely built-up flower, completely covering the center; soft pink, shaded silver.

— John Goode. *Hill.*

This is a fancy cut-flower variety. It is of almost globular form, of the finest silky finish, and destined to become a standard sort for cutting; the outer petals are delicate lavender, forming a decided band of color; the inner petals are clear lemon. A plant in bloom has a most beautiful airy appearance; it is a light willowy grower, though strong and healthy. In all but color resembles Mrs. Geo. Bullock. Very early. (W. K. Harris.)

— Josephine Schlicht. *U. S. Nur.*

Good-sized flower, rather flat, showing center; color white in center, beautiful pink around edges. Very light and beautiful variety.

Chrysanthemum, Jumbo. *U. S. Nur.*

Enormous large flower with long tubular petals, showing center ; fawn-color, light red at ends. Single.

— J. V. Farwell. *Geo. W. Mllier, Chicago.*

Soft violet-pink, lined with pale lavender and splendidly incurved. Received certificate of merit at Indianapolis under the name of W. N. Rudd. One of the "World's Fair Set."

— Kate Rambo. *H. Waterer and dealers.*

Pure white, with broad petals and double flowers ; florets curl at the tips and incurve slightly. Strong grower.

— Lily Bates. *T. H. Spaulding and dealers.*

Very large, perfectly double ; clear, bright pink ; petals broad and flat. A new and distinct form.

— Lizzie Cartledge. *T. H. Spaulding and dealers.*

Very large, full double flower ; under row of petals reflexed ; color dark rose, reverse silvery white.

— Louis Boehmer.

This, the "Pink Ostrich-plume" chrysanthemum, was imported and shown two years ago (see Annals for 1889, page 98), but it appears to have been first registered this year by Henderson. Introduced by U. S. Nur. in 1890 also.

— Lyman J. Gage. *Geo. W. Miller, Chicago.*

A rather late white, very heavy in texture, thus lasting well when cut ; it is of the perfectly double, grand incurving type. The color is of perfect purity ; the flowers are freely borne ; it is a good healthy grower, and the flower is as beautiful in its last stages as at any stage of its development. One of the "World's Fair Set."

— Madame Ferd. Bergmann. *Various dealers.*

Of medium size, pure white, very double, with creamy center. An extra good early sort. Lasts well. Imported.

— Mariposa. *U. S. Nur.*

Semi-double, very early floriferous variety ; light chrome-yellow color. Single.

— Martin A. Ryerson. *Geo. W. Miller, Chicago.*

A very large flower of great substance, and double to the last degree ; the center is raised high and finely whorled ; the outer petals are slightly recurving, broad and ribbon-like. The center petals are folded while whorling, but as the flower develops stand upright. The color is quite similar to Mrs. Frank Thomson, but brighter. One of the "World's Fair Set."

— Mary Moran. *Vaughan.*

Brilliant large yellow with strap-like petals, center erect, large flowers on stiff foot-stalks. (Thorpe.)

— Mary Waterer. *H. Waterer and dealers.*

Delicate rose ; the petals recurved to the stem, forming a perfect ball. Flower very large. Dwarf, but free.

— Mattie Bruce. *Fred Dorner and dealers.*

Silvery pink in color, of medium size.

Chrysanthemum Mattie C. Stewart. *T. H. Spaulding and dealers.*
Clear bright yellow, of fair size, petals broad and flat, reflexing, high built bloom. Won the Mattie Stewart silver cup at Indianapolis.

— Mermaid. *Fred Dorner and dealers.*
Very delicate yet bright pink, perfectly incurving broad petals, extremely delicate in color and finish. Extra good.

— Michigan. *U. S. Nur.*
Double flower of rich magenta color; very floriferous.

— Minerva. *U. S. Nur.*
Flower composed of needle-like tubular petals, light pink color, ends of petals a deeper shade of pink. Single.

— Mistletoe. *Fred Dorner and dealers.*
Of the Comte de Germiny type, with the outside of the petals silvery white, lined within with crimson; wide concave petals incurving until nearly globular in form.

— Mrs. A. Rogers. *Vaughan.*
A rich golden yellow; incurved, form of flower perfect, each bloom a bouquet. Has produced flowers over 9 inches in diameter. Strong, vigorous grower, season medium. (Siebrecht.)

— Mrs. D. D. Farson. *T. H. Spaulding and dealers.*
A most meritorious variety; size above the average, solid and compactly formed. Color rich silvery pink.

— Mrs. Falconer Jameson. *Various dealers.*
Enormous blooms of chestnut bronze of very pleasing shade (richer than W. W. Coles); high center; plant of good habit. Imported. (Cannell.)

— Mrs. F. G. Cary. *Geo. L. Miller, Stockton, O.*
Large flower, with ribbon-like petals, twisted and curled; each flower resembles a ball of ribbons; color flesh-pink, shaded white; a profuse bloomer. Japanese type.

— Mrs. G. B. Topham. *U. S. Nur.*
Very large semi-double flower, broad petals; color white, tinted on the edge with lavender. Single.

— Mrs. Herbert A. Pennock. *H. Waterer and dealers.*
In shape and habit much like Violet Rose, but somewhat larger; orange-yellow and very large. Strong grower. Late.

— Mrs. I. D. Sailer. *Hill.*
Took the Sailer prize at Philadelphia. A flower of the largest size, finely incurving, with broad sharply pointed petals; a strong grower, producing heavy flower-stems; the color is soft shell-pink, touched with lemon on the extreme tips of petals. Its keeping qualities after cutting are extraordinary. As shown by W. K. Harris, it is one-third larger than Ada Spaulding, and nearly a globe in form.

— Mrs. J. G. Whilldin. *Hill.*
Large, light yellow, of good form.

Chrysanthemum, Mrs. J. L. Childs. *Childs.*

Flowers large, double, 5 to 6 inches in diameter, borne on long stems; color pure white changing to blush, petals broad and shaving-like. The flower, when fully developed, forms a regular globe. Strong grower.

— Mrs. John Westcott. *H. Waterer and dealers.*

Creamy pink, shading to creamy white; flowers reflexed, of enormous size. Strong-stemmed and sturdy.

— Mrs. J. R. Baylis. *T. H. Spaulding.*

Immense incurving Japanese, in style of E. H. Fitler and Coronet. Clear yellow, striped with red, bronze and old gold.

— Mrs. Kendal. *T. H. Spaulding and dealers.*

A fine Japanese, with compact full center; color rich Jacqueminot-red, reverse of petals bronze, shading to gold. Free and good.

— Mrs. Lay. *T. H. Spaulding and dealers.*

A chaste and beautiful incurving flower. Petals cup-shaped, with faintest blush-lines on edges. Extremely double.

— M. Victor Patallier. *Various dealers.*

The flower is very large, nearly flat, and perfectly double. Very bright yellow; petals beautifully arranged. Imported.

— Moravia. *U. S. Nur.*

Loose flower, white center, graduated into light mauve. Single.

— M. P. Mills. *H. Waterer and dealers.*

Double, bright orange-yellow, extremely large and very late. Petals rather short, erect, and so arranged that the flower has a flat appearance.

— Oeta. *Nathan Smith & Son.*

Chinese incurved. Outer petals tinged and striped with rose, the center light yellow.

— Ontario. *U. S. Nur.*

Fine incurved flower showing center; bright chrome-yellow color. Very free-flowering.

— Ophelia. *George L. Miller, Stockton, O.*

Pure white, with yellow disc. Single.

— Orizaba. *U. S. Nur.*

Large massive flower showing center. Good stiff petals of bright chrome-yellow color. Single.

— Oswego. *U. S. Nur.*

Good stiff stem; fine double flower, creamy white tinged with lemon-yellow in center.

— Pandanus. *Vaughan.*

Strong stems; free grower; pure white petals of good substance; a perfectly double flower of large size. (Pitcher and Manda.)

— Philip Breitmeyer. *Hill.*

A most distinct variety, having heavy stems and foliage of light yellowish green. The flower is of the brightest golden yellow, extremely double; petals rather short and of heavy texture; of helianthus form. Raised by W. K. Harris.

Chrysanthemum, Porcupine. *Henderson.* *C. coronarium* var. *imbricatum;* which see.

— Potter Palmer. *Geo. W. Miller, Chicago.*

White seedling from Canning, which it somewhat resembles. A strong, fine grower, carrying the flowers on long stems. Color pure. Petals finely arranged, somewhat flat on opening, but gradually assuming a half-globular form of immense size, and of a silky, rustling texture. One of the "World's Fair Set."

— Progression. *T. H. Spaulding and dealers.*

Extra large late-flowering variety, blooming from December 1 to Christmas; color pure white; very double; style of Grandiflorum.

— Pythias. *Geo. L. Miller, Stockton, O.*

Golden yellow; long petals; flowers 4 to 5 inches in diameter. Single.

— R. Maitre. *Hill.*

Not surpassed by any pink in cultivation; of the largest size, perfectly double, and without a trace of coarseness. A splendid keeper, of most symmetrical form, and a thrifty grower. It perfects numerous flowers to the single plant. The color is delicate and exquisite.

— Robert A. Waller. *Geo. W. Miller, Chicago.*

A fine free grower, with long stems nicely clothed in foliage. The bloom is perfectly double, showing no center, and closely incurving, presenting a flat rather than globular appearance, and with level guard petals. The color is a beautiful shade of chamois-yellow. One of the "World's Fair Set."

— Robert Flowerday. *Nathan Smith & Son.*

Large-flowered Japanese. Outer petals flat with incurving center; upper surface bright crimson-lake, reverse silvery pink.

— Rose Laing. *Various dealers.*

Spiral center of heliotrope-pink; outer petals recurving, of blush-white, faced violet underneath. An unusually fine form for an early sort. Imported.

— Sabine Mea. *Various dealers.*

Very bright golden yellow, perfectly double and almost globular in form. A very beautiful variety. Imported.

— Santa Claus. *Henderson.*

Fleecy white, of large size and perfect form.

— Stanstead White. *Various dealers.*

Large petals, partly incurved, pure white. Imported. (Laing.)

— Stella. *U. S. Nur.*

Fine flower, with long pointed petals of beautiful soft rose color. Single.

— Sugar Loaf. *Hill.*

One of the freest-growing and freest-flowering sorts, and under the most ordinary treatment produces quantities of flowers of the largest size. The outer petals recurve slightly, while the inner rows incurve; the color is varying shades of yellow, often shaded bronze, sometimes perfectly clear.

Chrysanthemum, Sunflower (Swanley Yellow). *Various dealers.*

A Japanese chrysanthemum of massive character, broad, solid, and of a briliant yellow color. Imported. (Cannell.)

— Sunray. *Henderson.*

Rich yellow and light crimson.

— S. W. Allerton. *Geo. W. Miller, Chicago.*

A large-flowered extra good white variety, with distinct traits of character. A large, bold, pure white flower. Of sturdy, bushy growth, producing quantities of fine flowers. Raised by Mr. Monohan, gardener to H. Totter, Esq., Philadelphia. One of the "World's Fair Set."

— Target (Shenandoah). *Vaughan.*

Brilliant crimson, spatulated petals, bright yellow in center; full, perfect form; stout, erect stems; very striking, unique.

— Tremont. *Vaughan.*

Clear lemon-chrome, very distinct and pure in color, incurved, flower of good form, long stems, Wheeler style of petals, but more double. A fine flower. (Fewkes.)

— Tuscola. *U. S. Nur.*

Semi-double flat flower, tubular petals, long-spatulated; very delicate light yellow color. Single.

— Tyro. *U. S. Nur.*

Good stout grower, high flower, very broad petals of light fawn color.

— Ulysses. *U. S. Nur.*

Flower opening flat, and incurving afterward; growing on stout stems; the color is magenta, outer side deep lilac, large yellow eye. Single.

— Waban. *Vaughan.*

Pink; very large full flower with stiff stems; after the style of Robert Crawford, but more double, deeper in color, with much longer and broader petals, the outer of which reflex, while those of the center incurve, the effect being a superb show bloom. (Fewkes.)

— Washta. *U. S. Nur.*

Semi-double flat flower, tubular petals long-spatulated; deep chrome yellow color. Single.

— Wichita. *U. S. Nur.*

Deep rosy pink; very free. Single.

— W. W. Lunt. *U. S. Nur.*

Large massive double flower, lemon-yellow color; very effective.

— Yonitza. *Nathan Smith & Son.*

Chinese incurved, of perfect form; white, tinted with green. Formed of a dense mass of petals disposed in the form of a ball.

[Chrysanthemums, 121 varieties.]

The following 33 chrysanthemums were registered this year with the American Chrysanthemum Society, but do not appear to have been introduced :

Adele. *Edwin A. Seidewitz, Annapolis, Md.*
Alpha. *C. D. Kingman.*
Ancient City. *Seidewitz.*
Blushing Maid. *Kingman.*
California. *George Hollis, S. Weymouth, Mass.*
Canton. *Thomas Laurence, Ogdensburg, N. Y.*
Captain Crosbie. *Hollis.*
Champlain. *Laurence.*
Crimson Globe. *Hollis.*
Dorothy Tennant. *Kingman.*
Edith M. Hollis. *Hollis.*
Eglantine. *Kingman.*
James H. Freeland. *E. A. Wood, W. Newton, Mass.*
Jessie K. Crosbie. *Hollis.*
Kildare. *Kingman.*
Leather Stocking. *Kingman.*
Lord Baltimore. *Seidewitz.*
Mrs. Dudley C. Hall. *Mrs. E. M. Gill.*
Mrs. E. W. Wood. *Wood.*
My Maryland. *Seidewitz.*
Nain. *Hollis.*
Newton's Favorite. *Hollis.*
Rosalie. *Kingman.*
The American. *Seidewitz.*
The Correspondent. *Seidewitz.*
The Herald. *Seidewitz.*
The Journal. *Seidewitz.*
The News. *Seidewitz.*
The Sun. *Seidewitz.*
The World. *Seidewitz.*
Warrior. *Hollis.*
Warsaw. *Kingman.*
Weymouth Belle. *Hollis.*

Cimicifuga racemosa. *H. P. Kelsey. Gillett & Horsford.*
N. E. States.

Circæa Lutetiana. *Harlan P. Kelsey, N. C.*
A native woods herb of small size and very small flowers.

Citron, Corsican. *Division of Pomology, U. S. Dept. Agr.*

Coleus, Silver Leaf. *Henderson.*
Silvery white in the center of the leaf when grown under glass and very light yellow outdoors. Edge of foliage green.

Collinsia bartisiæfolia var. alba. *Orcutt.*
A cultivated white variety; rarely found wild in California.

Collomia (or Gilia) grandiflora. *Orcutt.*
Annual, 1–2 feet high, with large salmon flowers.

Cooperia pedunculata. *Gillett & Horsford.*
S. W. States.

Coreopsis trichosperma. *Harlan P. Kelsey, N. C.*
Flowers large and bright yellow ; 2 to 4 feet. Native.

Corn, Sweet, Early Dawn. *Johnson & Stokes.*
A large first early white corn, originating in northern Vermont.

— Lackey's Early. *Gregory.*
Sweeter and less liable to smut than Marblehead or Cory.

— New Champion. *Price & Reed.*
Early and large.

— Red-Cob Evergreen. *Henderson.*
Cob and kernels deep red ; 16-rowed. Sport from Stowell Evergreen, but a week or ten days earlier.

Crinum amabile var. minor. *Reasoner Bros.*
Mexico.

Cucumber, Early Chinese. *Vick.*
One to two feet long, very early ; light green, few spines and few seeds. From China.

— Livingston's Evergreen. *Livingston.*
Sent out for trial in 1890, as No. 35.

— Long Giant. *Salzer.*

— New Giant White. *Burpee.*
Grows 12 to 16 inches long by 2 or 3 inches in diameter, waxen white.

Cuphea Llavæ. *U. S. Nur.*
Individual flowers large, tube being bright red, opening of which is purplish blue, while protruding pollen masses are white.

Cupressus Guadalupensis. *Orcutt.*
Blue cypress. California. Mr. Orcutt also offers *C. Goveniana*, *C. Macnabiana* and *C. macrocarpa*, species which are to be found in some collections, but which do not appear to be grown by nurserymen.

Currant, Baldwin Black. *Bowles, Michigan.*
England.

— Climbing. *Curtice, New York.*

— North Star. *Jewell Nursery Co., Minn.*

Cybotium Barometz. *Reasoner Bros.*
China.

Cypripedium Arnoldianum (*Veitchii* × *concolor*). *U. S. Nur.*
Leaves 4 inches long by 2 inches wide, light green with hieroglyphic-like tessellation of dark green. Stem 4 to 5 inches high, dark brown with white, short down. Flower large, nearly 4 inches across petals. Dorsal sepal nearly round, slightly recurved on sides, lemon-colored at base, which color extends upwards. Veins vinous purple, slightly shading over the ground color. Lower sepal of same color, only veins not so pronounced. Petals 2 inches long, very broad ; inner portion lemon color, outer portion washed with vinous purple,

three-fourths of inner surface covered with dark crimson spots as in *C. Veitchii.* Lip long with narrow opening, bright lemon-yellow at base, deep vinous purple veins and dottings in upper part. Column light green. Staminode slightly horseshoe-shaped, lemon-yellow with purple border.

Cypripedium, Harrisianum var. Pitcherianum. *U. S. Nur.*

Very fine variety having dorsal sepal nearly flat ; of a vinous purple color, and approaching in beauty *C. Harrisianum* var. *superbum.*

— insigne var. Amesianum. *U. S. Nur.*

Flower same size and shape as *Maulei*, with very broad white margin, while green lower part is beautifully shaded with brown, whole flower being void of any spotting whatever.

— insigne var. Arnoldianum. *U. S. Nur.*

Flower same shape as *Maulei* but much larger, beautifully twisted and molded, both dorsal sepal as well as petals, the ends of the latter being twisted backwards. The whole flower has a rich hue, while the dorsal sepal has a clear white broad margin, the few small spots being confined to the lower green portion.

— insigne var. Brownii. *U. S. Nur.*

Flower large, of a livid green, spotted on petals, while dorsal sepal, which is heavily spotted with large blotches, has a coronet-like blotch at apex.

— insigne var. Cowperianum. *U. S. Nur.*

Flower of peculiar shape, dorsal sepal as in *albo-marginatum*, petal very long, lip short and broad. Whole flower is of greenish yellow hue, save white margin which extends all around the dorsal sepals and a few spots at the base of it.

— insigne var. Cuttingianum. *U. S. Nur.*

Flower very large and fine, of light green with broad dorsal sepal of which the upper portion is white with numerous light violet spots.

— insigne var. Eyermanii. *U. S. Nur.*

Flower size and shape of the type. Color is a beautiful light greenish yellow, while dorsal sepal has a broad white top and a few indistinct spots at base. Very distinct ; resembles *C. insigne* var. *Sanderæ.*

— insigne var. Gilmoreanum. *U. S. Nur.*

Flower large and bold as in *Chantinii*, dorsal sepal very large, white margin with large reddish brown spots through the middle and smaller ones on the sides. Lower sepal has brown streaks in six rows.

— insigne var. Mandevillianum. *U. S. Nur.*

Flowers size and shape of the *albo-marginatum* type, having white margin on top of dorsal sepal into which the regular and close lines of spots merge. Petals also thickly covered with small spots in regular rows.

— insigne var. nitens. *U. S. Nur.*

Stronger in growth than the type. Flower very large, of a uniform yellowish tint, while broad dorsal sepal has a broad white margin and rich brown-purple spots arranged in irregular rows. Has striking resemblance to the hybrid of the same name.

Cypripedium Pavoninum inversum (*Venustum* × *Boxalli*). *U. S. Nur.*

Leaves broader and heavier, markings, flower and shape same as Pavoninum, but color different. Dorsal sepal pointed, almost flat, with apple-green ground color, over which is a heavy shading of blackish brown; the border of same is pure white; lower sepal green. Petals slightly curved, green, shaded, lined and spotted in upper portion with dark brown. Lip light green with darker green veins. Whole flower shines as if varnished.

[Cypripediums, 12 varieties.]

Dais cotinifolia. *Reasoner Bros.*

South Africa.

Date, Fard. *Division of Pomology, U. S. Dep't of Agriculture.*

Arabia.

Delphinium virescens. *Harlan P. Kelsey N. C.*

A native larkspur, valuable for its pretty foliage and attractive habit.

Dichorisandra zanonia. *Saul.*

Dioscorea sp. *Reasoner Bros.*

Natal, South Africa.

Diphylleia cymosa. *H. P. Kelsey.*

Alleghenies.

Dock, Patience. *Wilson.*

Dracæna, Alsace Lorraine. *U. S. Nur.*

Upright-growing variety. Stronger and larger than *D. terminalis*, coloring easily and much finer in every way.

— argentea striata. *U. S. Nur.*

Rare. With small leaves beautifully lined with large silver bands.

— latifolia. *Reasoner Bros.*

South Africa.

— Lindenii. *U. S. Nur.*

Free and sturdy grower. Broad reflexed leaves which are beautifully variegated.

— Madame Haine. *U. S. Nur.*

Fine sturdy grower with reflexing green leaves lined with yellow.

— Neo-Caledonica. *U. S. Nur.*

Leaves light metallic in color, very large and hard.

Erythræa venusta. *Orcutt.*

A small annual, with bright sulphur-yellow and solferino flowers, known in S. California as a Canchalagua.

Erythronium grandiflorium var. albiflorum. *Orcutt.*

A pale yellow variety of the large Pacific species.

— Howellii. *Orcutt.*

Flowers light cream color, tinged with red; center yellow. Pacific coast.

Eucalyptus leptopheba. *Reasoner Bros.*

New South Wales.

Eucalyptus melanophloia. *Reasoner Bros.*
New South Wales.

— microcorys. *Reasoner Bros.*
South Queensland.

— siderophloia. *Reasoner Bros.*
New South Wales.

Fouquiera splendens. *Orcutt.*
A curious cactus-like plant 5–10 feet high, bearing terminal spikes of flaming scarlet flowers. Candle-wood or Hocotillo of our southwestern deserts.

Frasera Parryi. *Orcutt.*
Biennial, reaching 4 feet, and bearing white-spotted flowers. California.

Fraxinus dipetala. *Orcutt.*
Flowering Ash. A shrub from Lower California.

Fuchsia, Augustin Thierry. *Various dealers.*
Very massive folige with light red stems, large semi-double flowers; sepals clear red, corolla very bright rose. Imported.

— Bulgarie. *Various dealers.*
Brilliant single red sepals, large, clearly defined; corolla very large and spreading, of violet-plum color. Imported.

— Cervantes. *Various dealers.*
Plant of splendid habit with beautiful light green foliage; sepals bright rose; corolla very double, of a rose-mauve color, bordered with blue. Imported.

— Gigantea. *Vick.*
A sport from Phenomenal and like it except that the corolla is light magenta with dark crimson veins.

— Jupiter. *Various dealers.*
A French variety, said to be superior to Phenomenal. The plant is a tall grower; the leaves are dark green with veins of bright crimson. The flowers are as large as Phenomenal, are more compact, and the petals have more depth; sepals bright scarlet. with rich violet-purple corolla.

— Pierre Loti. *Various dealers.*
Flowers very double, with enormous violet-blue corolla and bright red sepals. Imported.

Garden Lemon. *Iowa Seed Co.*
This resembles the vine-peach in manner of growth, but is distinct in that the unripe fruit is striped with very dark green, nearly black, while the vine-peach is plain green, and when ripe, this is not russeted like the vine-peach. Fruit is somwhat smaller than vine-peach, has thinner flesh, and is more acid.

Gentiana puberula. *Gillett & Horsford.*
E. States.

Geranium, Admiration. *Various dealers.*

Single. A dwarf free grower ; large trusses Color white, shaded rosy salmon, deepest in the center. Imported. 1890-1.

— Attraction. *Various dealers.*

Double. Very large trusses of orange-red, passing to carmine-violet. Imported. 1890-1.

— Aurelien Scholl. *Various dealers.*

Single. Soft rose, with center of strong violet. White blotches on the upper petal. Imported. 1890-1.

— Bayard. *Various dealers.*

Trusses and florets large, of a beautiful vermilion color, of compact growth and free-flowering habit. Imported.

— Bonnat. *Various dealers.*

Large spherical trusses, flower full and of finest form. Color richest carmine-rose, of strong, vigorous growth with massive foliage. Imported.

— Buffalo Bill. *Hill.*

Double. Extra-fine variety ; cream, marbled rose. 1890-1.

— Copernic. *Various dealers.*

Single. Floret perfectly round ; a lively, beautiful shade of rosy carmine, changing to bright salmon at the base of the petals, with small white eye. Very large truss of florets on long footstalks ; a very noticeable color and quite distinct. Imported. 1890-1.

— Director Edmond. *Various dealers.*

Single. Orange-salmon shading to silvery lilac, with white eye. Fine for massing. Imported. 1890-1.

— Emile Augier. *Various dealers.*

Single. Flowers large, clear orange with white eye. Very brilliant. Imported. 1890-1.

— F. Becker. *Hill.*

A splendid grower, with broad, dark-zoned leaves. The flower forms a splendid truss of florets nicely displayed ; the color is glowing peach-pink, shading to carmine near the center and enclosing a white eye ; two petals are light scarlet, beautifully veined darker. Single. Hybrid of Souvenir de Mirande.

— Gerome. *Various dealers.*

Immense-sized trusses ; flowers double, dark violet-rose of a beautiful tint. Imported.

— Gripper Banks. *Various dealers.*

Double. Produces a larger truss of orange-scarlet flowers than any other double in cultivation ; very fine. Imported. 1890-1.

— H. De Parville. *Various dealers.*

Single. Very large truss of soft rose color. Veined with vinous red. Imported. 1890-1.

— Henri de Bornier. *Various dealers.*

Large trusses of double flowers, white delicately tinted ; plant covered with flowers. Imported. (Lemoine.)

Geranium, Jacques Callot. *Various dealers.*

Single. A seedling from Souvenir de Mirande, that finest of all the fancy geraniums. This variety is exactly identical with its parent, save for its larger size. Imported. 1890-1.

— Jeanne d'Arc. *Various dealers.*

Even freer in bloom than Mirande, while the color is most distinct and attractive, being a bright warm crimson, banded with creamy white. Imported. (Mirande type.) 1890-1 (?)

— L'Original. *Various dealers.*

Double. Flowers very large, and of odd, irregular outline; silver-salmon bordered with rose. Imported. 1890-1.

— Lowell. *Hill.*

Soft scarlet-pink of beautiful shade, florets circular in form, trusses of grand size; fine indoors and out. Single. Hybrid of Souvenir de Mirande.

— Madonna. *Hill.*

Bright green foliage of good substance, making a good background for the flower, which is the very softest shade of pale pink; the florets are large, and are arranged in handsome showy trusses well above the foliage; a most delicately beautiful color, and a very striking variety, attracting attention at once. Single. Hybrid of Souvenir de Mirande.

— Madame Chantrier. *Various dealers.*

Double. A fine winter bloomer of nice habit; enormous trusses composed of very large florets; rosy scarlet and solferino, with white reverse; magnificent color; a variety of the finest order. Imported. (Bruant.)

— Madame Dupont. *Various dealers.*

Rosette-formed flowers, brilliant deep scarlet; very free; trusses large, on strong footstalks. Imported.

— Madame la Comtesse de Pot. *Various dealers.*

Salmon-flesh color bordered with white; a fine budding variety. Single. Imported.

— Madame S. Deseglisse. *Various dealers.*

Double. Truss quite spherical, floret circular: clear bright rose color, marble-white and with white reverse. Imported, 1890-1.

— Melchior de Vogue. *Various dealers.*

Double. Very fine trusses of bloom; tender rose delicately tinted lilac. Imported. (Lemoine.)

— Mr. de Fortanier. *Various dealers.*

Double. Very large florets, quite round, and truss very large; rosy cerise and capucine-red, producing a very odd and beautiful effect. Imported. (Bruant.)

— Mrs. A. Blanc. *Hill.*

Flowers of the very largest size, round and perfect; apricot-red, touches of lilac at the center. Grand single variety for bedding out. (Bruant.) 1890-1.

Geranium, Mrs. J. M. Gaar. *Hill.*

Probably the finest of the single white bedders; semi-dwarf, as free in bloom as Katie Schulz; the plants have been a cloud of bloom all summer. Florets nicely shaped and of medium size. Hybrid of Souvenir de Mirande.

— Mrs. Trowbridge. *Miller.*

— M. Louis Fages. *Various dealers.*

A beautiful compact grower; fine foliage nicely zoned; trusses large, florets of extra size; semi-double. Color, clear orange. Very free in bloom. Imported. (Bruant type.) 1890–1.

— M. Poirier. *Various dealers.*

Single. Soft vinous rose; the prettiest geranium in this color, with markings on the upper petals that are beautiful. Imported. 1890-1.

— M. P. Olombel. *Various dealers.*

Brilliant vermilion-scarlet with orange shadings; trusses of immense size and perfect form. Imported.

— Montesquieu. *Various dealers.*

Very large semi-double florets of exquisite pale pink, with white eye. The nearest approach to the color of Grace Wilder; floret quite circular. An exquisitely beautiful variety. Imported. 1890-1.

— M. V. Noulens. *Various dealers.*

May be described as a scarlet Mirande. It is a magnificent variety of large size, and of the most brilliant combination of clear white, with scarlet border. Imported. (Mirande type.) 1890-1.

— P. Crozy. *Various dealers.*

A hybrid between the zonales and ivies. having the foliage of the former, but very heavy in texture, while the forms of truss and florets are found only among the ivies; the color is soft bright scarlet, with veinings of maroon; the habit is perfect, and it is a grand bedder. Imported. 1890-1.

— President Carnot. *Various dealers.*

One of the very best new geraniums of the year. Semi-double, florets and trusses of immense size; plant very free bloomer, color brilliant deep scarlet. Imported. Raised by Delesalle.

— Ruy Blas. *Various dealers.*

Very large double florets in medium-sized trusses. Large center of fiery salmon, edges a soft rosy salmon. Imported. 1890-1.

— Sacher Masoch. *Various dealers.*

Very large trusses of large double florets, currant-red in color. Imported. (Lemoine.)

— S. G. Cobb. *Hill.*

Beautiful floret with slightly overlapping petals; a sturdy grower with heavily zoned foliage; large showy truss on long stems; florets not crowded owing to length of footstalks; the two upper petals are white one-half the distance from the center; the other half is bright pink; the other three petals are bright pink, dotted near center with many tiny points of bright red, as in Cannell's Spotted Gem. Single. Hybrid of Souvenir de Mirande.

Geranium, Sully Prudhomme. *Various dealers.*

Florets very double, in large trusses, bright carmine in color. Imported. (Lemoine.)

— Tour Eiffel. *Various dealers.*

This variety resembles the famous Bruant in form of trusses and florets. Plant dwarf, but of strong, healthy growth and splendid for bedding. Color bright orange-scarlet; flowers semi-double. Imported.

— W. A. Chalfant. *Hill.*

Dazzling scarlet, florets circular and slightly cupped, forming a magnificent truss; heavy Bruant-like foliage assuring it a good bedder. Single. Hybrid of Souvenir de Mirande.

— Wm. Kelway. *Various dealers.*

Enormous trusses, florets double and fiery scarlet, Imported. (Lemoine.)

[Geraniums, 42 varieties.]

Geum radiatum. *H. P. Kelsey.*

N. E. States.

Gilia minima var. cærula. *Orcutt.*

California.

Gillenia stipulacea. *H. P. Kelsey.*

E. States.

Gladiolus, Bertha. *M. Crawford, Ohio.*

Tall and strong, exceedingly showy, makes an elegant spike, with numerous side branches, and multiplies rapidly. Color very bright, light scarlet, with a large purple blotch on the lower petals.

— Lulu. *M. Crawford, Ohio.*

The color is white, with the edge delicately penciled with dark crimson, resembling a Picotee pink.

— Mabel. *M. Crawford, Ohio.*

Of dwarf habit, usually less than three feet high. An early and abundant bloomer, and produces many bulblets. Color soft, rich carmine, in various shades.

— May. *M. Crawford, Ohio.*

White, delicately touched with pink. showing most near the ends of the petals. The two lower petals are marked with a peculiar light brown color.

Gladiolus, Nanceianus (Lemoine's) type. The following by *Saul:*

A. de la Davansaye.
Dr. H. P. Wolcott.
Harry Veitch.
J. H. Krelage.
Kleker.
Le Grand Carnet.
Massena.
Prof. Lambrin,
Prof. Sargent.
Rev. W. Wilks.

Gladiolus, Royal Queen. *Iowa Seed Co.*
[Gladiolus, 15 varieties.]

Gloxinia, Emperor Frederick. *Henderson.*
Vivid scarlet, margined with a clear white band.

Godetia quadrivulnera. *Orcutt.*
Slender annual, 1–2 feet, with white or purple flowers.

Grape, Magnificent. *Rice, Georgia.*
Red.

— Male Muscadine. *T. V. Munson, Texas.*
Introduced as a pollinizer for the bearing varieties of muscadines.

— Splendid. *Rice, Georgia.*
White.

— Superb. *Rice, Georgia.*
Black.

Grewia Caffra. *Reasoner Bros.*
Natal, S. Africa.

Gooseberry, Puyallup. *Puyallup Nursery.*

— Red Jacket. *Josselyn, N. Y.*

Habenaria blephariglottis. *Harlan P. Kelsey, N. C.*
A native orchid bearing pure white-fringed flowers.

Helianthus lætiflorus. *J. W. Manning.*
A native sunflower, 5 feet high, with deep yellow flowers 3 to 4 inches across.

Heteromeles arbutifolia. *Orcutt.*
California Holly or Christmas-berry. Evergreen shrub, with white flowers and scarlet berries. Rosaceæ.

Hibiscus, Faust's New Imperial. *Faust.*
Flowers 5 inches across, rich yellow. 5 ft.

Honeysuckle, Fuchsia-flowered. *Childs.*
A weeping honeysuckle. Flowers long and trumpet-shaped, coral-red, borne in large clusters and drooping like a fuchsia A strong, rapid grower; blooms during the entire summer and fall.

Hollyhock, Tokio. *Henderson. Johnson & Stokes.*
Flowers double, 12 to 15 inches in circumfence, the petals frilled, rich wine-maroon at base shading to cherry-red and broadly edged with white. 5 ft. Japanese.

Ipomæa Bronsoni. *Thorburn.*
A new perennial ipomæa with corrugated stem. A native of Cuba and was brought to this country by Dr. J. O. Bronson, on whose plantation in Florida the seed was grown. It is of most luxuriant growth, extending 50 feet in every direction, and completely hiding any structure over which it runs. It produces a profusion of white flowers over an inch in diameter, and of exquisite perfume. The seed must be started under glass.

Ixiolirion Tartaricum. *Gardiner.*
Imported from Europe.

Juniperus occidentalis. *Orcutt.*
Californian Juniper.
Kalmia hirsuta. *H. P. Kelsey.*
S. E. States.
Kola-nut (Cola acuminata). *Reasoner Bros.* *Dobson.*
West Africa.
Larkspur, Double-striped. *Iowa Seed Co.*
Lathyrus venosus and L. vestitus. *Orcutt.*
Wild peas. Californian.
Leek, True Scotch Musselburgh. *Gardiner.*

The superiority of this strain of leek lies in its size, rapidity of growth and fine quality. The stem in this fine sort seldom exceeds 6 or 8 inches in length, but it is often 2 inches or more in diameter in well-grown plants. It is exceedingly hardy, and the leaves are of a fine deep green, much larger than the large French leeks, and the blanched stem is also of superior mild flavor,

Leptosyne Douglasii and L. maritima. *Orcutt.*
Handsome Californian composites.
Lettuce, All Cream. *Salzer.*
A curled lettuce.
— Champion Spring and Summer. *Johnson & Stokes.*
An early head lettuce of a bright golden color.
— Denver Market. *F. Barteldes & Co., Kansas.*

Originated with a market-gardener of Denver, Col. The heads are large, solid, light green, beautifully curled like a Savoy cabbage, very crisp and tender. The crimpled leaves are a distinct feature. The heads are a little after the style of the Hanson but more oblong. Good either for forcing or outside use.

— Early White Self-folding Cos. *Ferry.*
— Genesee. *Barnard.*
A large heading lettuce, said to attain a weight of nearly 4 lbs.
— Golden Queen. *Henderson.*
Small early lettuce of a golden yellow color, of compact growth.
— Grand Rapids. *Various Dealers.*
A compact forcing lettuce, from Grand Rapids, Mich.
— Half Century. *Childs.*
Leaves fold together, forming a long loose head; very brittle.
— Large Yellow Market. *Dreer.*

This lettuce is of a greenish yellow color and makes very large flat heads of a solidity equal to that of a cabbage. They measure 7 inches in diameter by about 24 inches in circumfence and, unlike most other lettuces, are entirely free from unserviceable outside leaves. Unsurpassed for tenderness and durability. It hearts more rapidly than the late lettuces, and is unaffected by bad weather.

— New Sensation. *Johnson & Stokes.*
French.

Lettuce, Rawson's New Hothouse. *Raws.*

— Self-folding Trianon Cos. *Thorburn.*

Very early, being ready for use before the Paris White cos. Very large, solid, crisp and of excellent quality.

— Tillon's White Star. *Ferry.*

A white-seeded lettuce with large, loose, crisp and bright-colored heads.

[Lettuce, 13 varieties.]

Lilium Carolinianum. *Gillett & Horsford.*

— Grayi. *H. P. Kelsey. Gillett & Horsford.*

N. Carolina.

Linnæa borealis. *Gillett & Horsford.*

N. E. States.

Littonia modesta. *Reasoner Bros.*

South Africa.

Lœselia effusa and L. tenuifolia. *Orcutt.*

Phlox-like plants from California.

Lonicera oblongifolia. *Gillett & Horsford.*

N. E. States.

Lupinus affinis, L. arboreus, L. arboreus var. lutens, L. densiflorus, L. micranthus. *Orcutt.*

Californian lupines.

Maba Natalensis. *Reasoner Bros.*

South Africa.

Mamillaria deserti. *Orcutt.*

A cactus from the Mojave desert.

— phellosperma. *Orcutt.*

Californian.

Mangifera Indica: Green Mexican, and Melachoton. *Reasoner Bros.*

Cuba.

Melanthium Virginicum. *H. P. Kelsey.*

E. States.

Mignonette, Elmwood Giant. *Gardiner.*

Plants robust but dwarf, pyramidal in habit. Spikes very large, reddish.

— Red Giant. *Dreer.*

The result of several years' careful selection from Machet mignonette, and surpasses that excellent variety in every respect. The plant grows from 12 to 16 inches high, of pyramidal habit, very vigorous, slightly compact, and of perfect form. The flower-spikes when well grown are of enormous size, and the single blossoms of an intense red color.

Milletia Caffra. *Reasoner Bros.*

South Africa.

Monardella nana (M. macrantha var. nana), and M. lanceolata. *Orcutt.*

California mints; the former perennial and evergreen, with white flowers; the latter annual, with purple flowers.

Muskmelon, Banquet. *Henderson*

Medium size, flat at both ends and beautifully netted. Flesh dark salmon, of superior quality.

— Great Combination. *Childs.*

Large, late, long keeper, weighing 20 to 30 lbs.

— Johnson & Stokes' Superb. *Johnson & Stokes.*

A very large, late melon.

— Livingston's Market. *Livingston.*

A netted melon, green-fleshed, ripening with Hackensack.

— Netted Beauty. *Johnson & Stokes.*

Very early netted melon, with pale green, very thick, sweet flesh.

— Newport. *Henderson.*

Resembles Hackensack, except that it is smaller. Raised by J. P. Dickenson.

— Ornamental Pomegranate. *Livingston.*

Almost round, fruit orange-yellow slightly striped red and sometimes spotted red, varying from the size of a plum to that of an orange. Very fragrant. Probably the Dudaim melon.

— Shumway Giant. *Shumway and dealers.*

Round-shaped, light green, the skin smooth with little netting. Flesh deep salmon, thick, fine-grained and not stringy. Average weight 18 lbs.

Nemophila aurita. *Orcutt.*

Large violet flowers. Californian.

Nicotiana colossea. *Various dealers.*

A strong species, growing 6 to 9 feet high, with stiff red stems and very large rich green leaves.

Nolina Bigelovii. *Orcutt.*

A liliaceous plant 6 to 10 feet high. California.

Onion, Deutsche Perle. *Vaughan.*

This is the most excellent of all this class of onions for pickling and chow-chow. They are perfectly round, and the smaller ones resemble pearls as nearly as any vegetable can. They multiply from the base of the roots, the largest bulbs being the size of a five-cent piece, and the off-sets about the size of large peas. German.

— Southport Early Red Globe. *Gregory.*

Said to differ from the Southport Red Globe in being one of the earliest varieties of large onions.

Opuntia serpentina. *Orcutt.*

Procumbent. Yellow flowers. California.

— Tuna-manse. *Orcutt.*

Probably a form of *O. Tuna.* Fruit nearly globular, orange blotched with red. S. California.

Orthocarpus purpurascens. *Orcutt.*

Annual, 1 foot or less high, with yellow crimson-tipped flowers and gaudy bracts. Pacific.

Osteospermum moniferum. *Reasoner Bros*

South Africa.

Oxera pulchella. *Saul.*

New Caledonia.

Oxyanthus Natalensis. *Reasoner Bros.*

South Africa.

Papaver Californica. *Henderson.*

Annual, 1 foot, very bushy, producing in great numbers saucer-shaped flowers 6 inches in circumference, of rich pinkish orange with center of sulphur-yellow. California. (See also Poppy.)

Parsnip, Magnum Bonum. *Barnard.*

Pea, Leader. *Barnard.*

About 2½ feet high, very early.

— New Very Dwarf Sugar. *Henderson.*

Very dwarf, with large crimped pods.

— Nott's Excelsior. *Gregory.*

A wrinkled pea as early as American Wonder, with larger pods and half taller, and a heavier cropper. Raised by Richard Nott, Burlington, Vt.

— Stanley. *Horsford.*

— The Admiral. *Henderson.*

A wrinkled pea, unusually productive, the pods about the size of First of All, 3½ to 4 feet. English.

— The Don. *Henderson.*

A deep green wrinkled sort, producing large square-end pods; second early. 4 feet. English.

— The Mayor. *Henderson.*

A green wrinkled pea, of main crop. 3 feet. English.

Peach, Albright. *Engle, Pa.*

— Burke. *J. L. Normandy, Marksville, La.*

Perhaps sent out as early as 1889.

— Crosby. *Hale, Connecticut.*

— Diamond. *Albaugh, Ohio.*

— Gold Dust. *Olden Fruit Co., Missouri.*

— Hughes' IXL.—*L. T. Suders, Collinsburg, La.*

— Kalona. *L. T. Suders, Collinsburg, La.*

— Lancaster. *Engle, Pa.*

— Normand's Choice. *J. L. Normand, Marksville, La.*

Pear, Krull. *Mallinckrodt, Missouri.*

— Lincoln. *Jones, Illinois.*

— Marshall. *Foster, New York.*

Pecan, Beauty. *Munson, Texas.*
— Biediger. *Biediger, Texas.*
— Black Jack. *Brown, Florida.*
— Centennial. *Frotscher, La.*
— Favorita. *Brown, Fla.*
— Frotscher. *Frotscher, La.*
— Georgia Melon. *Brown, Fla.*
— Giant. *Biediger, Texas.*
— Helen Harcourt. *Brown, Fla.*
— Idlewild. *Biediger, Texas.*
— Jumbo. *Munson, Texas.*
— Longfellow. *Brown, Fla.*
— Mammoth. *Frotscher, La.*
— Pearl. *Munson, Texas.*
— Petite. *Brown, Fla.*
— Red River. *Munson, Texas.*
— Repton. *Brown, Fla.*
— Ribera. *Brown, Fla.*
— Risien. *Risien, Texas.*
— Stuart. *Stuart, Miss.*
— Turkey Egg. *Brown, Fla.*
— Van Deman. *Stuart, Miss.*
[Pecans, 22 varieties.]
Pentachæta aurea. *Orcutt.*
Pepper (Red), Black Nubian. *Burpee. Childs.*

Fruits long, deep blue-black from the first. Flowers deep purple.

— Childs' Kaleidoscope. *Childs.*

A long-pointed pendent pepper, changing, as it ripens, from canary to scarlet.

— Red Etna. *Burpee.*

An upright pepper of mild flavor.

Petunia, Plymouth. *Gardiner.*

Raised by Hender & Son, England.

Phacelia campanularia, P. Orcuttiana and P. Parryi, P. tanacetifolia and var. alba. *Orcutt.*

Southern Californian whitlavia-like plants.

Picea Sitchensis. *Orcutt.*

A colossal spruce, reaching 150 to 200 feet.

Pinus Lambertiana (Sugar-pine), Parryana (the Pinyon), P. Sabiniana (Digger-pine), and P. tuberculata. *Orcutt.*

Three Pacific coast pines.

Piper nigrum. *Reasoner Bros.*

Arabia.

Plum, Bailey. *Normand, La.*

A purple Japanese plum.

— Missouri Green Gage. *Stark Bros.*

— Normand. *Normand, La.*

A yellow Japanese plum.

— Plattman's Bunker Hill. *Herbert A. Jones, Himrods, N. Y.*

Originated at Yates county Nurseries, near Seneca lake, by J. H. Plattman, from seed of the Sugar-plum, which was grown side by side of the Washington and Reine Claude. It combines all the essential points of a valuable market sort; good grower; quality, season and productiveness good. Size of Washington, quality of Bradshaw and season of Reine Claude.

— Stark Green Gage. *Stark Bros.*

Seedling of Missouri Green Gage (see above), larger and more productive but not so high in quality.

Polygala Senega. *Gillett & Horsford.*

E. States.

Polygonatum giganteum. *H. P. Kelsey.*

E. States.

Pomelo, Royal. *Reasoner Bros.*

Very sweet sort.

Poppy, Eider-down (Papaver somniferum album laciniatum fl. pl.). *Henderson.*

Sturdy habit, 1½ feet, snow-white, the petals deeply frayed. (See also Papaver.)

— Rosy Morn. *Gardiner.*

A variety of Papaver pæoniflorum. Very unique in color. Flowers very double, rose.

— The Bride. *Dreer.*

A pure white single selection from the ordinary Papaver somniferum. The flowers are of large size, and the petals nearly entire at the margin. Flowers last well after being cut.

— White Swan. *Dealers.*

The plant forms a dense freely branching bush 2 feet in height; above this are elevated on strong, slender stems, the very large flowers. These are of immense size, very double, with beautifully laciniated petals, and of the purest possible white. It lasts longer in bloom than any other poppy.

Potato, Chautauqua. *Ford.*

Medium season; long, round or oval, skin rose color mottled with deep red; eyes numerous, prominent; size large to very large; vines large and stout, standing upright. Productive; good flavor.

— Advance. *Ford.*

Very early; oblong to long, round or oval; skin light red or pink, thickly netted; eyes quite numerous, slightly depressed, size medium to large. Of best quality, and very productive.

Potato, Freeman. *Maule.*

Grown by Mr. Freeman, Minnesota.

— Ideal. *M. Crawford, Ohio.*

Seedling of Jersey Peach-blow. Skin usually russeted, light creamy brown. Mid-season. High quality and very productive.

— Koshkonong. *Ford.*

Medium season ; oblong, oval or nearly round; skin creamy white, thickly netted all over; eyes plenty, but not numerous, slightest pink tint, some prominent, all have a well-defined brow; yet the eyes are shallow, giving the tuber a remarkably smooth appearanse; size large to very large ; vines remarkably stout and thrifty, withstanding drouth better than most kinds. Seedling in 1884, by Thomas Crane, Wis.

— Late Puritan. *Henderson.*

Like early Puritan, but later and more productive. Originated with Robert Birch, Michigan, from the Early Puritan.

— Negro. *Jerrard.*

A purple variety of choice quality. Seedling of the old Blue Christie from New Brunswick.

— Paris Rose. *Ford.*

Very early ; oblong, oval; skin rose color, much netted; eyes plenty, nearly even with the surface; size medium to large; quality excellent.

— Pride of Ireland. *Livingston.*

A late variety, white-skinned. Originated by Mr. Nigh, Wisconsin.

— Van Ornam's Earliest. *Iowa Seed Co.*

— Vaughan. *Vaughan.*

An inbred seedling of Peerless, raised by E. L. Coy, West Hebron N. Y. Skin flesh-color, flesh white and rich. Ripens with Early Puritan.

— Vick's Champion. *Vick.*

Tubers large and white with a russet coating; similar in form to Green Mountain, but more oval, and fuller at seed end.

— Woodbury's White. *Gregory.*

This is a white-skinned and also a white-fleshed sort, half oblong in shape. It has but few eyes, and they shallow ones. Medium early, mealy and well-flavored ; size large, with exceptionally few small ones. A great cropper. Originated in Maine.

[Potatoes, 13 varieties.]

Prosopis juliflora. *Orcutt.*

The Mesquit tree of California. The bean-like pods are eaten by the Indians.

— pubescens. *Orcutt.*

Screw-bean. Smaller tree than the last.

Prunus ilicifolia. *Orcutt.*

Evergreen Californian shrub, yielding edible fruit.

Pseudotsuga Douglasii var. macrocarpa. *Orcutt.*

A small white form of Douglas' spruce.

Pteris serrulata densa. *Saul.*

— Victoriæ. *Saul. U. S. Nur.*

East Indies. Originally discovered by I. Fosterman. Foliage neatly divided, the sterile fronds being much broader than fertile ones. Middle of frond beautifully variegated with silver-white.

Pumpkin, Calhoun. *Henderson.*

A medium to small pale yellow pie pumpkin.

Pyrola rotundifolia var. uliginosa. *Gillet & Horsford.*

Eastern states.

Quince, Alaska. *Green's Nur. Co.*

Hardy, early, of large size and good quality, deep golden yellow.

Radish, Acme *Salzer.*

— Livingston's New Pearl Forcing. *Livingston.*

Said to be a cross of Strasburg and Wood's Frame. White.

— Long Black Summer. *Ferry.*

— Sandwich. *Henderson.*

So called because it is largely used by the French and Germans for slicing for sandwiches, the radish taking the place of meat. This variety is of a pure snow-white color, similar to the White Strasburg in shape, but rather more stump-rooted. It produces small tops.

Raspberry, American Everbearing. *Cleveland Nur. Co.*

Obtained by introducers of M. Hatfield, Wayne Co., Indiana, who says: "It originated on a farm within a few miles of this place. I do not know its history from its first propagation, as it was on the farm when I first found it; since then I have had it in cultivation and I have given it the name of American Everbearing. The canes are large and stocky, and are about two weeks earlier than any raspberry I have known. The first crop is as full as the Gregg. The berry is as large, but much sweeter and better flavored. It is black, slightly covered with light mold. After the first crop is gathered, in two weeks the new crop is on hand, and from that time on till heavy frosts they are continuous in bearing."

— Ebon Beauty. (Blackcap.) *F. L. Piers, New Providence, Ind.*

— Coranth. *C. J. Coranth, Ann Arbor, Mich.*

— Lovett, or $1,000. *Lovett Co.*

Chance seedling found in Jefferson Co. Indiana, by Ezra Wood. Blackcap, as large as Gregg, but earlier, firmer and better flavor.

— Older. *Lovett Co.*

Chance seedling from Iowa. A mid-season blackcap, the fruits entirely devoid of bloom.

— Perfection. (Red.) *Loudon, Wisconsin.*

— Royal Church. *Church, Ohio.*

Raspberry, Smith's Prolific. *Ezra G. Smith.*

— Winant. *Ford.*

Red, resembling Thwack, but the canes are bluer and stronger, fruit slightly larger and better; firm.

Rhamnus alnifolia. *Gillett & Horsford.*

Eastern states.

Rhus cotonoides. *H. P. Kelsey.*

Alabama.

— ovata. *Orcutt.*

Evergreen shrub. The dark red berries are used for making a cooling drink. Pacific.

— typhina var. laciniata. *J. W. Manning.*

A cut-leaved variety of the common hairy sumac.

Ribes Cynosbati. *Gillett & Horsford.*

Eastern states.

— prostratum. *Gillett & Horsford.*

Eastern states.

— rotundifolium. *H. P. Kelsey.*

Eastern states.

Rosa Californica. *Orcutt.*

Rose, Abel Chatenay. *Various dealers.*

An elegant and graceful rose; large, full flowers, deliciously sweet; color bright, clear carmine, beautifully shaded and exceedingly handsome.

— A. Maille. *Various dealers.*

Extra-large, full flowers, borne on long stout stems; color brilliant carmine, passing to clear carnation red; highly recommended.

— Amanda Casado. *Various dealers.*

Flower of medium size. The center is a mingling of rose and chamois, outer petals bright pink, some petals marbled in rose and white. A good grower. Tea. French.

— Anna Cook (J. Cook). *Various dealers.*

Medium size, full imbricated flowers; fragrant; buff pink or pale rose delicately shaded with amber and coral red. Tea. An American seedling from Bon Silene.

— Augustine Guinoisseau. (White La France.) *Various dealers.*

A seedling from La France, retaining the habit of growth, fragrance and blooming qualities of the parent variety, with flowers of a pearly white, shading toward the center to light rose. Hybrid tea. See ANNALS for 1890, 43, 55. 1890–1.

— Baroness M. Werner. *Various dealers.*

Color, rich creamy white shaded with salmon and amaranth; petals broad; perfumed. Tea. French.

Rose, Beauty de Grange Héby. *Various dealers.*

Flowers large, double; white shading to yellow at the center, lasting long after being cut. Cross between Baroness Rothschild and Mme. Chédanne Guinoisseau. A strong grower, good for outdoor culture. Hybrid tea. See ANNALS for 1890, 49.

— Bona Weillshott. *Various dealers.*

A very strong grower; flower large and double, and of the centifolia form. Color rosy vermilion, with center of orange-red; very sweet. Hybrid tea. See ANNALS for 1890, 42, 55. 1890-1.

— Buffalo Bill. *Various dealers.*

Extra-large buds and flowers, fine imbricated form, somewhat flattened at center, but very full, rich and handsome; color bright shining rose, passing to deep pink or cerise-red; highly perfumed.

— Charles de Franciosi. *Various dealers.*

Flower large, double; chrome-yellow shading to salmon, the outer petals shaded rose; the bud long and orange-red. Tea. See ANNALS for 1890, 46.

— Christine de Noue. *Various dealers.*

Flowers large, finely formed, of heavy texture; maroon-red; petals imbricated; very sweet; vigorous and free. Tea. See ANNALS for 1890, 44.

— Climbing Niphetos. *Various dealers.*

Sport from Niphetos, and like it, save in habit. See ANNALS for 1890, 56.

— Climbing Perle des Jardins. *John Henderson Co.*

Sport from Perle des Jardins, of American origin.

— Comte de Grassin. *Various dealers.*

A cross with Gen. Jacqueminot, and a strong grower. The flowers are produced in clusters, are double and of large size, and very sweet; the color is silvery rose, shaded carmine. Hybrid perpetual. French.

— Comtesse de Bouchard. *Various dealers.*

Flowers very large, double, of good form; orange-yellow, the backs of the petals a paler shade. Rampant grower. Climbing tea. See ANNALS for 1890, 44.

— Comtesse de Vitzthum. *Various dealers.*

Flowers large, double, finely formed, center bright Naples yellow, shading to a higher tint. Strong and free. Tea. Seedling of Perle des Jardins. See ANNALS for 1890, 45.

— Comtesse Eva Starhemberg. *Various dealers.*

Flower double, heavy in texture, creamy yellow, shading to ochre at the center, the borders of the petals touched with rose. Bud long. Free. Tea. See ANNALS for 1890, 46.

— Comtesse Julie de Schulenburg. *Various dealers.*

Color bright purple, of a deeper shade in center. Flowers large and full. Plant of vigorous habit. Hybrid perpetual. French.

Rose, Dr. Dusillet. *Various dealers.*

Flowers large, salmon-yellow at the center, changing to clear yellow at the ends of the petals; also shaded rose. Strong dwarf grower. Free. Tea. French.

— Dr. Reymont. *Various dealers.*

This hardy, everblooming sort was obtained by crossing Gen. Jacqueminot and the *Rosa polyantha* or *multiflora*. It inherits the hardiness and splendid crimson-colored flowers of Gen. Jacqueminot—which are but little reduced in size—with the profuse blooming qualities of the polyantha class, thus combining the two qualities most desired in a garden rose.

— Duchesse de Dino. *Various dealers.*

Flowers large and double; color crimson, with shadings of bright carmine; a strong grower. Hybrid perpetual. 1890-1.

Duchesse Marie Salviati. *Various dealers.*

Beautiful chrome-yellow, elegantly tinged with orange, passing to buff, prettily flushed with rose, buds and outer petals orange-red: the buds are long, large and pointed, the flowers extra-large, quite full and very sweet. See ANNALS for 1890, 42, 54.

— Eliza Chatelard. *Various dealers.*

A sturdy dwarf grower, bearing a profusion of flowers from 1 to 1½ inches in diameter; color rosy carmine of very rich shade. Polyantha. See ANNALS for 1890, 49.

— Eliza Fugier. *Various dealers.*

Bud much like Niphetos, of which it is a seedling, but flower is deep cream, sometimes edged with pink. Free, with better habit and handsomer foliage than its parent. Tea. See ANNALS for 1890, 44.

— Emile Bardiaux. *Various dealers.*

A strong, rampant grower; flowers large and double; color bright carmine-red, shaded soft violet. Hybrid perpetual. 1890-1.

—Etoile d'Angers. *Various dealers.*

Of strong constitution and good habit; produces nicely pointed buds, opening into double flowers of globular form and heavy texture. The color is chamois-yellow bordered with peach, and with shadings of bronze; quite new and distinct. Tea. See ANNALS for 1890, 47.

— Etoile d'Or (Star of Gold). *Various dealers.*

Full round flowers, perfectly double, borne in large clusters, pale chrome-yellow, wlth rich citron-red center; blooms quickly and profusely, and besides being exceedingly beautiful, is entirely distinct from all others.

— Gen. Mertchansky. *Various dealers.*

Flowers large and double, nearly erect and of heavy texture, elegant in form, tender, rosy flesh color, with bright center; bud rounded, yet long. Tea. See ANNALS for 1890, 51.

Rose, George Faber. *Various dealers.*

Of very vigorous growth, with dark, rich foliage. The flowers are semi-double, with large and beautiful buds. Color bright carmine, shading towards the center to light pink. French.

— Gloire de l'Exposition Bruxelles. *Various dealers.*

Flowers finely formed, large, and perfectly double; color purplish crimson; of velvety texture. Hybrid perpetual. French. 1890-1.

— Gloire de Margottin. *Vick.*

Bright red, very brilliant flowers; large, full, well-formed and globular; of good habit. Hybrid perpetual. French.

— Gloire des Cuivres. *Various dealers.*

Of a very unique color, which is coppery yellow, shading to orange-yellow; reverse of petals vinous red. The large and finely formed flowers are very double and sweet. French.

— Golden Gate. *Dingee & Conard Co.*

This is the prodnct of Safrano and Cornelia Cook. The flowers are large, of good substance, very double and full; color rich, creamy white, tinged and shaded with fine golden yellow; petals large and broad, and frequently bordered with clear rose.

— Gribaldo Nicola. *Various dealers.*

Flowers large and double, of Malmaison form; color silvery white, with rose and yellow center; reverse of petals bright rose; very sweet. A splendid bedder, free in bloom. Tea. See ANNALS for 1890, 45.

— Gustave Nadaud. *Variovs dealers.*

A free-branching grower, with large double flower; the outside petals are large and rounded, giving it an exquisite cup shape. Color vermilion, with clear touches of carmine-lake and soft pink center. Tea. See ANNALS for 1890, 42. 1890-1.

— Gustave Piganeau. *Various dealers.*

Flowers extra-large, equaling Paul Neyron in size, double, and of cup form. Color a beautiful shade of red and brilliant carmine. Hybrid perpetual. See ANNALS for 1890, 43. 1890-1.

— Gustave Regis. *Various dealers.*

The color is soft yellow, very lightly edged carmine; semi-double. Hybrid tea. French.

— Henry Brichard. *Various dealers.*

A splendid grower, producing quantities of buds, which are large and quite double; nearly white shading into a bright, rosy carmine center. Hybrid tea. See ANNALS for 1890, 45.

— Henry M. Stanley. *Dingee & Conard Co.*

This everblooming rose was raised from Mme. Lambert and Comtesse Riza du Parc, and is recommended as a charming variety of unusual beauty and permanent value. The color is a rare shade of amber-rose, delicately tinged with apricot-yellow toward scenter. Reverse of petals clear buff-rose; the flowers of good substance, extra-large, finely formed, and very full and fragrant.

Rose, J. B. Varrone. *Various dealers.*

A fine grower; flower large and very double, with high center opening from long buds. Color soft china-rose, changing to bright deep carmine of even shading; an extra-good rose and very sweet. Much superior to Luciole, which it greatly favors, but of a better growth, and much freer in its blooming qualities. See ANNALS for 1890, 42. 1890-1.

— Jeanne Guillaumez. *Several dealers.*

A very vigorous grower; flower large and double, of good form, with beautiful long buds. Color clear red, touched with salmon; center coppery with pale silvery shading. Tea. See ANNALS for 1890, 42, 55. 1890-1.

— Joseph Metral. *Various dealers.*

A strong, vigorous rose, resembling Red Malmaison. Flowers are large and very double; color magenta-red, passing to cerise, and shaded with purple. French.

— Jules Lemaitre. *Various dealers.*

A very strong grower; flowers large, double, and of globular form; color bright rosy carmine; sweet-scented. Seedling from Mme. Isaac Pereire. Hybrid pepetual. See ANNALS for 1890, 48.

— La Chanson. *Various dealers.*

Flowers carried erect, large and double bud, long and perfect form; color fine rosy carmine, very bright. Seedling from Isabel Nabonnand. Tea. See ANNALS for 1890, 51.

— Lady Arthur Hill. *Various dealers.*

A most vigorous grower, with flowers of the largest size, double and finely formed. Color fine silvery rose of most pleasing shade. Seedling from Beauty of Waltham. Extra good. Hybrid perpetual. See ANNALS for 1890, 43. 1890-1.

— Lady Castlereagh. *Various dealers.*

Very large flowers, full, with thick lasting petals; color pale rose, shaded with fine sulphur-rose; fragrant. Tea. (Dickson.)

— Laforcade. *Various dealers.*

Color brilliant carmine-red; flowers large and quite double; a strong grower. Hybrid perpetual. See ANNALS for 1890, 43. 1890-1.

— La France de '89. *Various dealers.*

(Reine Marie Henriette × La France.) Pronounced by several noted French rosarians as the most remarkable hybrid tea of late years. One notable peculiarity of the variety is its long, elegant buds, which are often 2½ inches in length. Another strong point is its bright color, which is very nearly scarlet. It is a rapid and strong grower, but is not perpetual in character of bloom. 1890-1.

— Laurent Carle. *Various dealers.*

Flowers delicate, tender and rich; sweet.

Rose, Madame Adolphe de Tarle. *Various dealers.*

Medium to large size flowers, somewhat flat form, having an indented or ruffled outline, quite noticeable and pretty; color clear canary-yellow, sometimes passing to white, tinted with sulphur-yellow, delicately shaded with rosy blush; highly perfumed.

— Madame Andre Duron. *Various dealers.*

It is a dwarf, compact grower, making it a particularly valuable sort for the garden; has dark crimson, very double flowers, which are perfect even in the hottest weather, and has the rich spicy perfume peculiar to the finest hardy roses. It will prove to be entirely hardy if given a protection of straw, leaves or litter in the winter Hybrid tea.

— Madame Allegatiere. *Various dealers.*

Clear shell-pink, passing to a delicate shade of fine coral-rose, elegantly suffused with pale carmine; very pretty buds and large, well-filled flowers, deliciously perfumed. (Remontant Hybrid Polyantha.)

— Madame Baron Veillard. *Various dealers.*

This new everbloomer somewhat resembles in form and habit the old Souvenir de la Malmaison, but is much brighter in color and exceedingly handsome. Extra large, round, full, regular flowers, perfectly double; color clear, silvery flesh, beautifully flushed with bright pink, deepening at center to fine carnation-red. A good bloomer, very fragrant; quite hardy.

— Madame Caroline Testout. *Various dealers.*

The bloom is large and double; color bright satiny pink, with rosy center. Petals very large and heavy, and beautifully rounded. First-rate variety for forcing. Of the La France type. Fragrant. Hybrid tea. French.

— Madame Charles Frederick Worth. *Various dealers.*

Flowers very large and double, fine form and substance; makes beautiful buds; a strong, vigorous grower, and true perpetual bloomer; color lovely carnation-red, passing to fine rosy crimson.

— Madame Durand. *Various dealers.*

Of strong, half climbing habit; flower of finely rounded form, and quite double; beautiful shade of yellow, blooming in clusters. Tea. See ANNALS for 1890, 46.

— Madame Elie Lambert. *Various dealers.*

Extremely free in bloom and vigorous in growth; the flower is globular and cup-shaped; the outer petals are purest white, while the center is a beautiful rosy flesh color. Tea. See ANNALS for 1890, 49.

— Madame Jules Cambon. *Various dealers.*

A strong, bushy grower, with large flowers freely produced on long stems. Color rosy flesh, reflex of petals magenta; a very promising variety on account of its beautiful buds. French.

Rose, Madame Martha du Bourg. *Various dealers.*
The color is flesh, shading toward the center to delicate peach ; base of petals orange-yellow ; flowers large and very double ; the half-expanded buds, with delicate blending from white to deep rose and orange. See ANNALS for 1890, 42. 1890-1.

— Madame Moreau. *Various dealers.*
Elegant peachy red, passing to apricot and fawn ; large, very double flowers, deliciously sweet, very beautiful. See ANNALS for 1890, 54.

— Madame Olga. *Various dealers.*
Pure white, center pale, chrome-yellow ; the flowers are medium to large in size, very double, with almost innumerable petals, which grow smaller and become slightly twisted and imbricated toward the center. A free bloomer, and of good sturdy habit. See ANNALS for 1890, 55.

— Madame Philippe Kuntz. *Various dealers.*
A strong grower, bearing its flowers quite erect. These are large and double, of cherry-red color, passing to salmon and flesh. French. 1890-1.

— Madame Pierre Liabaud. *Various dealers.*
Flowers large, double, and of exquisite form; color soft flesh-white. Seedling from Madame Isaac Pereire. Hybrid perpetual. See ANNALS for 1890, 50.

— Madame Renahy. *Various dealers.*
Flowers large, double, and of fine globular form ; color rosy carmine, with brighter center ; reverse of petal soft silvery heliotrope. Very sweet and free. Hybrid perpetual. See ANNALS for 1890, 43. 1890-1.

— Madame Sadi Carnot. *Various dealers.*
Blooms in large clusters, fine full flowers ; clear bright cherry-red, passing to magenta ; makes pretty buds and is delightfully perfumed.

— Madame Sophie Stern. *Vick.*
Fine globular form, very double and full ; color clear carmine, changing to rose, delicately clouded with crimson. Free bloomer. Very fragrant. Hybrid perpetual. French.

— Madame Thibaut. *Various dealers.*
A strong grower ; flower of fine double form, imbricated like a camellia ; soft satiny rose color, shading to rosy carmine. Hybrid perpetual. 1890-1.

— Mademoiselle Genevieve Godard. *Various dealers.*
Very pretty for button-hole and corsage ; medium size flowers, very full and regular ; color clear carmine-red ; very handsome and sweet.

– Mademoiselle Marguerite Fabisch. *Various dealers.*
A very remarkable, brilliant and showy variety ; rich crimson with white center ; large, well-filled flowers, very fragrant and striking.

Rose, Madeleine d'Aoust. *Various dealers.*

Extra-fine, large regular flowers, perfectly double and full to the center; rich apricot-yellow, shaded coppery red; outer petals silvery white; very sweet.

— Maria Sage. *Various dealers.*

Large double flowers, borne in clusters, delightfully perfumed; color fine china-rose, shaded lavender and pink; it is a healthy, vigorous grower and a prodigious bearer; blooms most all the time.

— Marquise de Forton. *Various dealers.*

Lovely creamy white, delicately tinged with pale canary-yellow, elegantly flushed with tender carmine; medium size; deliciously perfumed.

— Martin Cahuzac. *Various dealers.*

Flowers of extra size and very fine form, quite globular; beautiful rose color and bright carmine; extra good. Hybrid perpetual. French. 1890–1.

— M. L. de Vilmorin. *Various dealers.*

A strong grower; flower large and double, and of especially fine form; clear bright red, with dark veinings and shadings of velvety brown. Hybrid perpetual. 1890–1.

— Maud Little. *Dingee & Conard Co.*

Raised from Pierre St. Cyr and Duchesse de Brabant. A very pretty rose, of good form and substance, not entirely full, but very handsome and sweet; color soft china-rose, with a peculiar glowing, lustrous bloom.

— Maurice Rouvier. *Various dealers.*

Of remarkable vigor for a tea rose; flower of enormous size and quite double; splendid form; color soft, tender rose, shaded and varied with red. See ANNALS for 1890, 51.

— Miss Jeannie Dickson. *Various dealers.*

Rosy pink, the entire margin of petals being distinctly edged with silvery pink, base of petals having a pale yellow zone, making a beautiful and novel contrast. The flowers are of unique form, very large, full, with a very high center, which stands up prominently and is shown to great advantage; petals of heavy substance, very large and smooth; growth vigorous, foliage distinct and handsome, excellent habit. Hybrid perpetual. (Dickson.)

— Miss Marston. *Various dealers.*

Large flowers with beautiful buds; color light rose, shading toward the base of the petals to chrome-yellow, each petal having a distinct border of bright rose. Of strong, vigorous habit. See ANNALS for 1890, 54.

— Mr. James Brownlow. *Various dealers.*

A cross between Marquis de Castellane and Paul Neyron; brilliant carmine, very large, full, and symmetrically formed flowers, highly perfumed. (Dickson.)

Rose, Mrs. Degraw. *Henderson.*

Rich glossy pink, fragrant, and a vigorous grower. Valuable for flowers between July and August. Hardy. Originated some years ago by Wm. Burgess.

— Mrs. James Wilson. *Various dealers.*

This resembles in form the superb rose Catherine Mermet. The flowers are deep lemon-yellow, changing to white; the border of the petals tipped with rose. (A. Dickson & Sons.)

— Mrs. Jessie Fremont. *Dingee & Conard Co.*

This is a seedling from Duchesse de Brabant, with not quite such large buds, but large, perfectly double flowers, well filled and handsome; color white, passing to deep rosy flesh, sometimes shaded with coppery red or old rose.

— Mrs. Paul. *Various dealers.*

Has the vigorous habit and handsome foliage of the seed parent, Mme. Isaac Pereire, as well as its thoroughly perpetual character. In addition, it produces flowers of great beauty and exceptional distinctness. The magnificent guard-petals, for smoothness of contour, size and substance, are unsurpassed, while the pearly white color, sometimes suffused with peach, is very pleasing. Said to be the best Bourbon offered in several years. (Wm. Paul & Son.)

— Mrs. Wm. Watson. *Various dealers.*

A cross between Madame Vidot and Merville de Lyon; flowers of a beautiful pink color, petals shell-shape, and of large size. The blooms are large, full, of globular form, and are produced freely on stiff, erect shoots; the growth is vigorous, foliage large and handsome. (Dickson.)

— Pearl Rivers. *Dingee & Conard Co.*

The result of a union between Devoniensis and Mme. de Watteville. It partakes of the leading characteristics of both parents, but resembles the latter most closely; the flowers are large and quite full, with fine, peachy red buds. The ground color is ivory-white, having the petals delicately shaded and bordered with pale rose.

— Pink Rover. *Various dealers.*

Flower very large, double; a vigorous grower; tender rose of delicate shade; very free, extra good, quite similar to Malmaison, but brighter in shade. Bourbon. (Wm. Paul & Son.)

— Professeur Ganiviat. *Various dealers.*

Vigorous in growth, and free in bloom; flower double and of good form, of the color of Souv. Th. Levet. Tea. See ANNALS for 1890, 50.

— Progress. *Various dealers.*

Color brilliant rosy carmine, with yellow shadings at the base of the petals. The flower is large, nearly double, and the form of Louis Van Houtte. Very free in flower, and a fine grower. Hybrid tea.

— Red Pet. *Vick.*

Color, bright dark crimson. Free bloomer. Similar in habits to Polyantha White Pet. Tea Polyantha.

Rose, Ruby Gold. *Henderson.*

This variety originated with Mr. T. O'Connor, Providence, R. I., and is the product of Catherine Mermet grafted on a Marechal Niel rose, which, contrary to all previous belief, have been fused into an entirely distinct variety by some mysterious process of nature, the result being a composite likeness of both. It has retained the dwarf habit of Mermet, while the color of the flowers shows the perfect blending of the golden yellow of M. Niel with the pink of Mermet, the result being a tawny shade of yellow, bordering on old gold, through which run veins of rosy red and pink.

— Sappho. *Various dealers.*

An English tea rose, of large and globular form ; buds fawn color suffused with rose ; the opening flower shaded yellow and buff ; center deep bright yellow. Very double and a remarkably free bloomer. See ANNALS for 1890, 54.

— Skobeleff. *Various dealers.*

Brilliant rose color, passing to lilac purple, elegantly flushed with clear carmine ; large, bold globular flowers, very double and full ; delightfully perfumed, remarkably large and finely formed buds.

— Snowflake (Marie Lambert). *Various dealers.*

Free-flowering white tea.

— Souvenir Clairvaux. *Various dealers.*

Flowers medium to large in size, and of a beautiful form ; color bright china-rose, the base of the petals apricot shading to nankeen-yellow, with touches of carmine ; free in bloom and very sweet. Tea. See ANNALS for 1890, 48.

— Souvenir de Auguste Legros. *Various dealers.*

A very fine grower ; flowers large and double, withbeautiful long buds ; fiery red, fringed with silvery crimson. French. 1890–1.

— Souvenir de Bruel. *Various dealers.*

A fine, large, full, handsome rose ; bold globular flowers, well borne up on stout stems ; color, clear bright carmine or rosy pink, passing to deep flesh, reverse of petals silvery rose ; very fragrant.

— Souvenir de François Gaulain. *Various dealers.*

Raised by the French rosarian, M. Guillot. The flowers are of medium size and so very double that the fully expanded flower is more beautiful than the bud. Color deep red, shading to carmine.

— Souvenir de Lady Ashburton. *Various dealers.*

A strong vigorous tea, that is very floriferous ; flower of great size and quite double ; very changeable in color, showing a great variety of shades—red, salmon, yellow, scarlet, sometimes combined, and again as selfs. Tea. See ANNALS for 1890, 51.

— Souvenir de Madame Sablayrolles. *Various dealers.*

Flower of beautiful globular form, large and double ; color rosy apricot, shaded yellow, edged carmine. A vigorous seedling from Devoniensis. Tea. See ANNALS for 1890, 44.

Rose, Triomphe de Pernet Père. *Various dealers.*

(Gen. Jacqueminot and Desir.) Of strong constitution and fine habit; flower large, double and of heavy texture; bud long and nicely pointed; free in bloom. Hybrid tea. See ANNALS for 1890, 50.

— T. W. Girdlestone. *Various dealers.*

Flower of enormous size, very double, and of fine form; color, bright vermilion with shadings of lake. Strong grower, free and fragrant. Hybrid perpetual. (Dickson.)

— Waban. *E. M. Wood & Co.*

See pages 74, 76; also ANNALS for 1890, 43.

— White La France.

See Augustine Guinoisseau.

[Roses, 102 varieties.]

Rubus hispidus. *Gillett & Horsford.*

Eastern states.

Rudbeckia fulgida. *H. P. Kelsey.*

Eastern states.

Salvia carduacea and S. Columbariæ. *Orcutt.*

California thistle-sages or chias. The latter is used by the Indians for making a beverage or as medicine.

Sambucus glauca. *Orcutt.*

California elder. Berries edible.

Saxifraga cucanthemifolia. *H. P. Kelsey, N. C.*

A native saxifrage with white flowers spotted with yellow and with bright pink protruding stamens.

Scabiosa, Beaten Gold (Aurantiaca). *Henderson.*

Flowers very large, golden yellow.

— Royal Purple. *Henderson.*

Flowers very large, purplish claret, velvety.

Scirpus atrovirens. *Gillett & Horsford.*

Eastern states.

Shepherdia Canadensis. *Gillett & Horsford.*

Northern states.

Simmondsia Californica. *Orcutt.*

An evergreen shrub, 5 to 15 feet high, producing edible fruit.

Solidago cæsia. *Gillett & Horsford.*

Eastern states.

— puberula. *Gillett & Horsford.*

Eastern states.

Spiræa (Astilbe) compacta multiflora. *Gardiner.*

Imported from Europe.

Squash, Island Prize. *Johnson & Stokes.*

An oblong squash, creamy yellow, with a thick sweet flesh. Said to have come from the Pacific Islands.

Squash, Mammoth Summer Crookneck. *Ferry.*

Fruits twice larger than the ordinary crookneck and earlier.

Stachys aspera. *H. P. Kelsey.*

Eastern states.

Strawberry, Accomack. *McMath Bros., Onley, Va.*

First attracted attention in a lot of seedlings set in 1887 on the grounds of the originator, McMath Bros., Accomack Co., Va. The plant is a rank, vigorous grower, and like the Bidwell, is somewhat inclined to stool. The fruit is large and handsome, approaching Sharpless in size; of good color, excellent flavor, perfect bloomer, and quite as productive as Bubach No. 5. It ripens about five days later than Hoffman and Michel Early, and ten days earlier than Crescent, and holds up well through the season. Introduced in the fall of 1891 and spring of 1892.

— Alice. *Hancock, Ky.*

— Auburn. *Geo. L. Miller, Stockton, O.*

Perfect; a good grower, with dark heavy foliage, perfectly healthy; berries large, regularly conic, and quite uniform in size; color dark crimson throughout; a pleasant. acid to the taste. Firm enough to carry well. Runners short-jointed.

— Australian Crimson. *W. J. Earle, Azusa, Cal.*

— Barton's Eclipse. *Barton, Ky.*

Kentucky seedling of Longfellow. Pistillate. 1890. (?)

— Beebe. *Lovett Co.*

Originated in 1885 with E. P. Beebe, Union Co., N. J.

— Beverly. *Benj. M. Smith, Beverly, Mass.*

— Brunette. (Perfect.) *G. Cowing, Muncie, Ind.*

— Cameronian. *L. J. Farmer, Pulaski, N. Y.*

A large perfect-flowered berry from Ohio.

— Dallas. *Silva & Son, New Castle, Cal.*

— D & D. *Dobbins.*

— Dr. Morain. *Fonta, Louisiana.*

Imported from France.

— Estelle. *Engle, Michigan.*

— Fairmount. *Apgar, N. J.*

— Fancy. (Perfect.) *I. F. Street, West Middleton, Ind.*

— Farnsworth. *Green's Nur. Co.*

A high-class home berry. Perfect.

— Gillespie. *Geo. L. Miller, Stockton, O.*

Originated by Mr. Gillespie and exhibited before Butler Co., Ohio, Horticultural Society in 1887. Tall, luxuriant grower, free from rust, and enduring extremes of heat and cold; blossom perfect; berries of the largest size, regularly oblong, rounded or blunt at the apex; color bright scarlet; flesh firm, but melting, sweet and good; a decided improvement on Haverland, having perfect flowers, larger berries and of better quality, without stringy or hard center; it has fair carrying qualities; prolific.

Strawberry, Governor Hoard. *M. Crawford, Ohio.*

Seedling of Sharpless, which it resembles in growth. Fruit large, roundish conical and somewhat flattened, with a slight neck; brilliant red, firm, of high flavor; borne on tall and stout stems. Perfect. Has been tested for ten years.

— Imperial. *W. S. Reddick, Neptune, La.*

— Iowa Beauty. *Lovett Co.*

Originated by C. E. Walsworth, Marshall Co., Iowa.

— Lehigh. *W. B. K. Johnson, Allentown, Pa.*

— Martha. *M. Crawford, Ohio.*

Originated by Wm. Lyons, Minneapolis, who named it for his daughter. In both plant and fruit it resembles the Wilson, but it is pistillate and the flesh of the berry is very red.

— Michigan. *Engle, Mich.*

— E. P. Roe. *Orange Co. Nur. (T. J. Dwyer), Cornwall, N. Y.*

Found in the garden of W. B. Brown, Newburgh, N. Y. in 1887. Perfect. Said to be very late.

— Sadie. *Cleveland Nur. Co.*

It is a very strong, healthy grower; dark foliage ; the berry is very uniform in size and shape, carries its berries well up from the ground. Very early. It was originated by M. T. Thompson of Cuyahoga Co., Ohio, who says it is about the size of Wilson, but one of the most productive he ever saw.

— Standard. *Parker & Wood.*

Originated at North Reading, Mass.

— Waldron. *Ford and others.*

Originated in Ohio.

— Woolverton. *M. Crawford, Ohio.*

Fruit large, in form like Bubach, bright red. Perfect. Remains a long time in flower. Originated by John Little, Canada.

[Strawberries, 28 varieties.]

Streptocarpus, new hybrids. *Dealers.*

Raised by Watson and by Veitch, England.

— Rexii Dunii. *Saul.*

Stuartia Virginica. *H. P. Kelsey.*

Southeastern states.

Sunflower, Sulphur Gem. *Henderson.*

Flowers delicate primrose or sulphur-yellow with a black center. 5 feet, tree-like.

Symphoricarpus racemosus var. pauciflorus. *Gillett & Horsford.*

Northeastern states.

Tiedemannia rigida. *H. P. Kelsey.*

Eastern states.

Todæa barbara. *Reasoner Bros.*

Queensland.

Tomato, Bon Ton. *Garretson.*

A large, firm, purple variety, much like Acme and Beauty.

— California Fig. *Salzer.*

A yellow fruit.

— Climbing. *Childs.*

— Cumberland Red. *Johnson & Stokes.*

Originated in Cumberland Co., N. J. A large red, solid smooth variety.

— New Yellow Peach. *Vaughan, Rawson, Gardiner and others.*

Like Peach except in color.

— New Zealand. *Wilson.*

A small yellow variety.

— Ponderosa. *Henderson.*

An enormous pink variety, sent out as No. 400.

— Potomac. *Joseph Harris.*

A purple tomato of good size, solid and regular.

— Red Mikado. *Dreer.*

Like Mikado except that it is a red (not purple) tomato.

— Ringleader. *Dreer.*

Fruits very large. The flesh is very thick, solid and of excellent quality; free from acidity and desirable for slicing. It is a second early variety.

— Stone. *Livingston.*

A solid, smooth, red tomato of good size.

— Telegraph. *Salzer.*

— Thorburn Long-Keeper. *Thorburn.*

Originated by E. S. Carman, editor of the *Rural New-Yorker*, by selection, during thirteen years, from the longest-keeping fruit of each year. A good uniform pink or purple sort of medium size, regular and productive,

[Tomatoes, 13 varieties.]

Tradescantia rosea. *H. P. Kelsey.*

Eastern states.

Trautvetteria palmata. *H. P. Kelsey*

Alleghenies.

Turnip, Monarch or New Tankard Ruta-Baga. *Ferry.*

Large tankard-shaped roots, short and small necks, small tops, and yellow, fine grained flesh.

Turræa heterophylla. *Reasoner Bros.*

Natal, South Africa.

Umbellularia Californica. *Orcutt.*

California laurel. 10 to 70 feet high, evergreen.

Vaccinium Canadense. *Gillett & Horsford.*

Northern states.

Vaccinium corymbosum var. atrococcum. *Gillett & Horsford.*
Eastern states.

— erythrocarpon. *H. P. Kelsey.*
Southern states.

— hirsutum. *H. P. Kelsey, N. C.*
A native hairy shrub, the fruit being edible.

— Oxycoccus. *Gillett & Horsford.*
Northern states.

Vepris lanceolata. *Reasoner Bros.*
South Africa.

Veronica serpyllifolia. *H. P. Kelsey.*
Eastern states.

Viburnum pubescens. *Gillett & Horsford.*
Eastern states.

Viola striata. *H. P. Kelsey.*
Eastern states.

Walnut, Vilmorin. *Gillet, Cal.*

Watermelon. *F. Barteldes & Co., Kansas.*
This melon is grown extensively in western Kansas and eastern Colorado. It belongs to the citrons, and can be used only for preserves or stock food. The melons grow to a large size, some of them weighing as high as 60 or 70 pounds. The flesh is firm and solid, with only very few seeds. The melons will keep all winter, and can be fed to stock same as turnips and beets.

Watsonia densiflora alba. *Reasoner Bros.*
Africa.

Zizia aurea var. Bebbii. *H. P. Kelsey.*
Eastern states.

Zizyphus Parryi. *Orcutt.*
California jujube. Spiny shrub, producing an edible fruit.

Zygadenus leimanthoides. *H. P. Kelsey, N. C.*
Native. White showy flowers in an open panicle; 1 to 3 feet.

ADDENDUM.

The following additions and corrections should be made to the volumes for 1889 and 1890. Various additions of native plants should be made, but these are recorded in the Census of Cultivated Indigenous Plants (§ 2).

Apple, Carlough.
Is erroneously written Carbough in ANNALS for 1889, 97.

Balsam, Burpee's Defiance. *Burpee.* 1890.

Begonia, Gloire de Lucerne. *Dealers.*

Evidently a cross between Teuscherii and Rubra, both of which it resembles in foliage, while the bloom is the most beautiful rosy vermilion. The leaves are of beautiful form, broad and deeply lobed, bronze green above and purple below. The plant assumes a fine tree form with a little attention. 1890.

— M. de Lesseps. *Dealers.*

A decided improvement on Argentea guttata, the leaf being four times the size seen in that variety, while the silky texture is the same and it is beautifully spotted with silver. A very strong, free-growing variety, that will succeed with any ordinary care, growing rapidly and sending out quantities of leaves. 1890.

— Robert George. *Dealers.*

Rex hybrid. A fine upright grower, showing Diadema blood in the habit; the leaves are large, and show the Rex textures; they are nicely notched and deeply pointed; the markings are very fine, of bright silver arranged in a zone. 1890.

— Wettsteinii. *Dealers.*

The leaf is more ornamental than Rubra, being peculiarly indented, and a rich shaded coloring, dark marbled green, shading lighter, with a line of scarlet at the edge. The flower is similar to Rubra, but is a brighter shade. 1890.

Carnation, Tidal Wave. *W. P. Simmons & Co.* 1889.

Chrysanthemum, Mrs. Wm. Bowen. *Hill.*

The finest, freest-growing and freest flowering of the Wheeler type. 1890.

Cucumber, Siberian. *Northrup, Braslan & Goodwin.* 1889.

Geranium, Souvenir de Mirande. *Various dealers.*

The most popular geranium of later years; has proved a charming surprise to both florist and amateur. Pure white, banded in bright pink. 1889 or 1890.

Peach, Champion.

Recorded as introduced last year by Hamilton of Michigan (see ANNALS for 1890, 173), is perhaps an error. W. A. Taylor, Assistant Pomologist of the Department of Agriculture, writes as follows concerning it: "Alex. Hamilton, Ganges, Mich., grew a stock of trees on contract for one Gibson, about 1887 or '88, but discarded the variety as worthless on account of mildew. Gibson named it Champion about 1887, I think, and sold it through Allegan county. The Champion introduced in 1890 was by I. G. Hubbard, Nokomis, Ill. and is a distinct peach."

Plum, Bongoume. (Japanese.) *J. T. Whitaker, Tyler, Texas.* 1889.

Rose, Captain Lefort. *Various dealers.*

A strong-growing variety, producing a great profusion of beautiful light satiny rose flowers, the reverse of the petals and the center being shaded with deep pink. The blooms are semi-double, with finely shaped buds. French. 1889 or 1890.

Rose, Dr. Pasteur. *Various dealers.*

Rosy carmine, a beautiful clear shade; flowers globular, finely formed; free-flowering; dark, rich foliage. Hybrid tea. French. 1889 or 1890.

— Duchess of Albany. *Various dealers.*

A sport from the well-known and popular La France. While it resembles its parent in several respects, it is quite distinct in color, being of a rich, deep even pink tint, and the shape is more finished; it is equally vigorous, free-blooming and fragrant. One of the most important of recent acquisitions. Hybrid tea. Wm. Paul & Son. 1889 or 1890.

— Duchess of Leeds.

Seedling from La France, but much deeper in color, especially on reverse of petals. Habit and foliage similar to parent. Hybrid perpetual. 1889 or 1890.

— Madame Joseph Desbois. *Various dealers.*

Flesh color, shaded with salmon-rose; vigorous and free-blooming. Hybrid tea. 1889 or 1890.

— Mary Washington. *Childs. Dingee & Conard Co.*

A hardy perpetual climber from Mt. Vernon. Flowers medium in size, pure white, perfectly double, fragrant. 1890.

Squash, Illinois Beauty. *Vaughan.*

An autumn variety in season from September to December, average size 12 to 14 inches long, and 4 to 5 inches in diameter. Very thick meat, having almost no seed cavity; remarkably distinct and showy in appearance, one or both ends being of deep green color while the center band is of rich deep orange, slightly ribbed, but of excellent shape for the market and of good quality. 1890.

Strawberry, Phillips Seedling No. 1. *Mahan.*

Spring, 1890.

Tomato, Lambrigger's Yellow Humbert. *Cold Spring Seed Farm, Big Horn City, Wyo.*

Said to be a cross between Yellow Pear and King Humbert. 1890.

Turnip, Moore's Golden Crown Ruta-Baga. *Delano Moore, Presque Isle, Me.* 1890.

§ 2. *Census of Cultivated Indigenous Plants.*

A RECORD OF ALL THE SPECIES OF PLANTS NATIVE TO NORTH AMERICA, NORTH OF MEXICO, WHICH HAVE BEEN COMMERCIALLY INTRODUCED TO CULTIVATION.

The extent to which temperate North America has contributed to the catalogue of cultivated plants has never been made the subject of statistical inquiry. There is a general feeling that, as a people, we have not appreciated our native plants, and it is probably true that they have been much neglected until within very recent years. Many of our familiar garden fruits and flowers are of American origin, but they have seemed few in comparison to the whole number of desirable and tractable native species. The following catalogue, however, shows that the number in cultivation at the present time is very large, and it is probably the best evidence which can be adduced to show that Americans possess a fondness for plants and gardens.

It is not strange that American plants should have been first cultivated in England or other parts of Europe. Horticulture, especially the growing of plants for ornament, reaches its highest development only as the face of nature becomes softened by improvements and as institutions become staid and self-sustaining. And it has always been true that plants have been first appreciated, as a rule, in countries to which they are strange and unfamiliar, for novelty has been quite as important as merit in favoring their dissemination. The early American botanists, of whom John Bartram was the chief, sent numbers of live plants and seeds to the botanic gardens of Europe, and the labors of these men were supplemented by many European collectors traveling in this country, from the time of Linnæus until near the middle of this century. Drummond, Fraser, Douglas and their cotemporaries were particularly assiduous in acquainting the gardens of Europe with American plants. Long cultivation has greatly modified many of these early introductions, so that even in European botanic gardens American plants often assume forms strange to one who has known them only in a wild state. Even at Kew, as Director W. T. Thiselton Dyer writes me, "the American species are mostly represented by cultivated forms and the feral types are wanted." I have endeavored in the following catalogue to record the date of introduction or of the first record of our plants in England. It will be noticed that very few of the dates are recent. On the other hand, if dates could be obtained of the independent introduction of native plants to cultivation in America very few of them would be found to be old.

There appears to have been a distinct movement in the seventies towards the introduction of native plants. Several persons, mostly independently of each other, began then to collect and offer roots for sale. This appears to have been the first movement of the kind. Thomas Meehan, who has spent a long and busy life in the study of our native flora, both as nurseryman and botanist, writes me the following reminiscence: "I think that there was no effort to cultivate our native plants until in comparatively recent years. When I came to Philadelphia, in 1847, the introductions to our gardens were wholly from Europe. It was rare to find even an American tree, to say nothing of herbaceous plants. Even the cultivated varieties of our native plants, such as phloxes, pentstemons and rhododendrons, came from Europe. In 1847 Mr. Buist told me that he had attempted to introduce our native herbaceous plants, but found the prejudice against them too strong. He was fond of telling an anecdote in connection with *Dodecatheon Meadia*, which he had introduced from Ohio, then 'the far west.' To an admiring lady who had purchased but had not paid for a plant, he happened to remark that it was one of the most beautiful of our wild-flowers. 'Is it a wild thing?' she asked; 'then I don't want it.' He gave us younger fellows this bit from experience to teach alike the folly of saying more than is necessary in a business operation and the futility of getting a trade for wild plants.''

Mr. Taylor, of Charlotte, Vermont, began to ship American plants to England as early as 1854, and for some twenty years he collected rather extensively for that purpose and to supply a small home demand. C. G. Pringle, of the same place, well-known of late as one of the most indefatigable explorers of our southwestern and the Mexican floras, was one of the earliest dealers in native plants. ''It was in the autumn of 1873,'' he writes, ''that I began to collect American plants for cultivation by supplying Asa Gray with roots of *Cypripedium arietinum* for planting in the Cambridge Botanic Garden, and George E. Davenport with many living ferns, cypripediums, trilliums, etc., which he shared with John Robinson, Minot B. Pratt and others. The next year I planted a wild garden and sent large numbers of native plants in exchange to Dr. George Thurber, Dr. Hooker, of Kew, and Van Houtte, of Ghent. From exchanging I went on in 1875 to selling, and supplied several European firms with many North American species collected by myself and others all over the country. The two following years I snatched a few weeks each fall from my breeding of plants to carry on this business. Then in 1878, anticipating becoming a botanical traveler, I associated with me in the plant trade my cousin, F. H. Horsford. Nearly every year in Mexico I have had the good fortune to discover some plant of value for garden culture. In 1887 it was *Tigridia Pringlei.* In 1888 the most noteworthy was *Tigridia buccifera.* And since then other species of tigridia have come in my way.'' The first printed price-list of the firm was issued in 1880 to the foreign trade.

Edward Gillett, Southwick, Massachusetts, entered the trade in 1875 by selling *Rhexia Virginica, Lygodium palmatum, Nymphæa odorata, Hepatica triloba* and a few others. His first catalogue was issued in 1877, but so late as 1880 only about fifty species were offered. In 1881 he issued an important catalogue, which appears to have been the first considerable effort of the kind, and consequently I have quoted it freely in the following census. In 1889 Messrs. Gillett & Horsford formed a partnership which continued until near the close of 1891.

One of the most important nurseries of American plants is that established by George C. Woolson at Passaic, New Jersey, and it was probably the first to attain prominence. In 1870 Mr. Woolson became associated with the late Dr. George Thurber on the *American Agriculturist* and *Hearth and Home*, and went to live with him at "The Pines" in Passaic. Dr. Thurber was an excellent botanist and an ardent lover of gardening, and Mr. Woolson found a small collection of native plants growing on his premises. To the enlargement of this private collection Mr. Woolson devoted much energy for several years, and in 1878, having observed the growing demand for native plants, he organized a commercial nursery with Dr. Thurber, under the name of Woolson & Co. Many of the best collectors in the country contributed to the progress of the enterprise and the firm soon gained a wide reputation. In 1889 the firm was reorganized as H. Meyer. The first catalogue of the firm which I have been able to obtain is that of 1883, and this I have quoted in the following catalogue.

Harlan P. Kelsey, Linville, North Carolina, is a prominent dealer in native plants and has brought to notice many of the rare and interesting species of the Southern Alleghanies. His first attempt at the cultivation of native plants was made in the spring of 1884, when he was but a lad. His facilities have enlarged year by year, and he is frequently quoted in the following record.

Several other firms pay great attention to native plants and some of them have made important introductions. Among these may be mentioned Jacob W. Manning, Reading, Mass.; United States Nurseries, Short Hills, N. J.; Thomas Meehan, Germantown, Penn.; Temple & Beard, Cambridge, Mass.; Reasoner Bros., Manatee, Florida; and very recently the Orcutt Seed and Plant Company, of San Diego, California, has made many introductions.

The following census, the preparation of which has extended over two years, is supposed to chronicle every species native to North America, north of Mexico, which has been introduced into cultivation in this country through the trade. There are many other species to be found in botanic gardens and private collections, but such do not come within the scheme of this inquiry. Whenever possible, an approximate date has been assigned to their introduction by reference to the catalogue of Gillett, Gillett & Horsford, Woolson & Co., Kelsey, and others. When the species has been in cultivation for many years, or when it has been found to be impossible to assign any definite date, an asterisk has been used to denote that the species has come into cultivation in this country. The dates of introduction into England, or the dates of the first record of them there, are taken entirely upon the authority of *Nicholson's Illustrated Dictionary of Gardening.* It will be seen that many species which have appeared in England have never been introduced into American trade. It does not follow, however, that species are actually in cultivation in England because they are recorded in this list. The record simply shows that they were once introduced into England. Some of them have never been known there outside botanic gardens and many of them have been lost to cultivation. Many of the southern species were introduced into England from the West Indies or Mexico. The census may contain many errors and omissions, but the difficulties of its preparation are almost insurmountable, and at most it is only preliminary to a more thorough study of the subject at some future time. But no pains has been spared to make it as reliable as our present knowledge will permit.

There are in North America, north of Mexico, about 10,150 known species of native plants, distributed in 1,555 genera and 168 families. Of these, 2416 species are recorded in this census, representing 769 genera* and 133 families. Of this number, 1929 species are now offered for sale in America; 1500 have been introduced into England, of which 487 are not in cultivation in this country. In order to show the ratio of cultivated species to those not yet introduced, the number of species in each genus is given.

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*Excluding the hepaticaceous genus (and family) marchantia, the last one enumerated in the census.

EXPLANATIONS.—An * denotes that the plant has been in cultivation in this country for several or many years, or at least that the date of its introduction has not been determined.

Gill., Edward Gillett, Southwick, Mass.

G. & H., Gillett & Horsford, Southwick, Mass.

Hors., F. H. Horsford. In some cases two dates are given following this reference. The one in parenthesis refers to the year in which the plant was first actually sold, while the other date refers to the year in which the plant was first recorded in a printed catalogue.

Wool., Woolson & Co., Passaic, N. J.

Kelsey, Harlan P. Kelsey, Linville, N. C.

Orcutt, Orcutt Seed and Plant Co., San Diego, Cal.

Eng., England. The date in parenthesis refers to the date of introduction or to the first record of the plant in England.

In the absence of an * or a reference to a dealer, the plant is understood to be not in cultivation in this country.

When no authority or author's name follows a variety, it is indication that the variety is a garden form.

RANUNCULACEÆ, CROWFOOT FAMILY.

Aconitum. 18 or 20 species; 5 in U. S.

A. Californicum has been catalogued, but there is no such species; possibly a mistake for A. Columbianum.

A. Columbianum, Nutt. (A. Fischeri?)*

A. delphinifolium, D. C. (Eng. 1820.)

A. tortuosum, said by Dict. Gard. to be N. American (1812) is evidently the Siberian A. tortuosum, Willd.

A. toxicum, said by Dict. Gard. to have come from N. America (1825), is probably the Old World species. (A. toxicum, Reichb.)

A. uncinatum, Linn. * (Eng. 1768)

Actæa. Species 3, northern hemisphere; 3 American.

A. alba, Bigel.* (Eng.)

A. spicata, L. var. arguta, Torr. Gill. 1881.

A. spicata var. rubra, Ait. * (Eng.)

Anemone. About 75 species, in temperate regions; in our region 16.

A. Caroliniana, Walter. * (Eng. 1824.)

A. decapetala, Linn. * (Eng.)

A. deltoidea, Hook. *

A. multifida, Poir. * (Eng.)

A. narcissiflora, Linn. * (Eng. 1775.)

A. nemorosa, Linn.* (Eng. 1825, as A. lancifolia.) White and blue varieties.

A. nemorosa var. alba. fl. pl. Wool. 1883.

A. patens, Linn. var. Nuttalliana, Gray. * (Eng. 1826.)

A. Pennsylvanica, Linn. (A. dichotoma) * (Eng. 1768.)

A. Virginiana, Linn. Kelsey '91-'92. (Eng. 1722.)

Anemonella. Species 1.

A. thalictroides, Spach. (Thalictrum anemonoides. Anemone thalictroides.) Gill. 1881. (Eng. 1768.)

Aquilegia. Perhaps 20 species; 9 in our region.

A. cærulea, James. * (Eng. 1864.)

A. cærulea var. alba. Wool. 1883. (Eng.) There is a double-flowered variety.

A. Canadensis, Linn. * (Eng. 1640.)

Var. flaviflora, Britton. Wool. about 1889.

A. chrysantha, Gray. * (Eng. 1875.)

A. chrysantha var. alba. Henderson 1890.

A. flavescens, Wats. Gill. 1881. (Eng. 1872.)

A. formosa, Fisch. Gill 1881. (Eng.)

A. truncata, Fisch. & Meyer, Gill. 1881. "The form in cultivation is a hybrid, with large yellow flowers, the sepals and spurs of a peep orange-red."—Orcutt.

Caltha. Species about 9; 4 in U. S.

C. biflora, DC. Gill. 1881. (Eng. 1827.)

C. leptosepala DC. * (Eng. 1827.)

C. palustris, Linn.* There is a double-flowered variety catalogued.

C. palustris var. Sibirica, Regel. (var. parnassifolia.) (Eng. 1815.)

Cimicifuga. 8 or 10 species; 5 within our limits.

C. Americana, Michx. (Eng. 1824.)

  - C. racemosa, Nutt. Kelsey '90-'91. G. & H. 1891. (Eng. 1732.)
  - C. racemosa var. cordifolia, Gray. (C. cordifolia.) (Eng. 1812.)
- Clematis. About 100 species; 18 in U. S.
  - C. Catesbyana, Pursh. Wool. 1883.
  - C. coccinea, Engelm. * (Eng. 1868.)
  - C. crispa, Linn. (C. cylindrica). (Eng. 1726.)
  - C. Douglasii, Hook. Gill. 1881.
  - C. Fremonti, Watson. *
  - C. ligusticifolia, Nutt. Gill. 1881.
  - C. ochroleuca, Aiton. Wool. 1883. Gill. 1884. (Eng. 1767.)
  - C. Pitcheri, Torr. & Gray. * (Eng.)
  - C. verticillaris, DC. Gill. 1881. (Eng. 1797.)
  - C. Viorna, Linn. * (Eng. 1730.)
  - C. Virginiana, Linn. * (Eng. 1767.)
- Coptis. A half-dozen species; 4 in this country.
  - C. asplenifolia, Salisb. (Eng.)
  - C. occidentalis, Torr. & Gray. (Eng.)
- C. trifolia, Salisb. Gill. 1881.
- Delphinium. About 40 species; 25 in U. S.
  - D. azureum, Michx. * (D. virescens.) (Eng. 1805.)
  - D. azureum var. album. (Eng. 1882.)
  - D. cardinale, Hook. * (Eng.)
  - D. decorum, Fisch. & Mey. Gill. 1881.
  - D. exaltatum, Aiton. (Eng. 1758.
  - D. Menziesii, DC. Gill. 1881.
  - D. nudicaule, Torr. & Gray.* (Eng. 1869.)
  - D. simplex, Dougl. Gill. 1881.
  - D. tricorne, Michx. (Eng. 1806.)
  - D. trolliifolium, Gray. Gill. 1881.
- Hepatica. 2 species.
  - H. acutiloba, DC. *
  - H. triloba, Chaix.* Gill. 1875. Native also to Europe, where several varieties are in cultivation.
  - H. triloba var. alba. Gill. 1884.
  - H. triloba var. cærulea fl. pl. Wool. 1883.
  - H. triloba var. rubra fl. pl. Wool. 1883.
- Hydrastis. 1 species.
  - H. Canadensis, Linn. Gill. 1881. (Eng. 1759.)
- Pæonia. Perhaps a dozen species; 1 American.
  - P. Brownii, Dougl. Gill. 1881. (Eng. 1826.)
- Ranunculus. 160 or more species; 53 are in the United States and northwards.
  - R. adoneus, Gray. Gill. 1881.
  - R. affinis, R. Br. var. cardiophyllus, Gray. (Eng. 1829.)
  - R. Californicus, Benth. Gill. 1881.
  - R. Suksdorfii, Gray. Hors. 1889.
- Thalictrum. About 50 species; a dozen American.
  - T. dioicum, Linn. *
  - T. Fendleri, Engelm. Gill. 1881.
  - T. minus, Linn., var. adiantifolium. Wool. 1883.
  - T. occidentale, Gray. Gill. 1881.
  - T. polycarpum, Watson. Gill. 1881.
  - T. polygamum, Muhl. (T. Cornuti.) Gill. 1881.
  - T. purpurascens. Linn. Wool. 1883.
  - T. sparsiflorum, Turcz. Gill. 1881.
  - T. venulosum, Trelease. Hors. 1889.
- Trautvetteria. Species 2; America and Japan.
  - T. grandis, Nutt. (T. palmata var. occidentale.) Gill. 1881.
  - T. palmata, Fisch. & Mey. Kelsey '90-'91. (Eng.)
- Trollius. Species 9 or 10; 1 American.
  - T. laxus, Salisb. * (Eng. 1805.)
- Xanthorhiza. Species 1.
  - X. apiifolia, L'Her. * (Eng. 1766.)

CALYCANTHACEÆ, CALYCANTHUS FAMILY.

- Calycanthus, 4 or 5 species; 4 North American.
  - C. floridus, Linn. * (Eng. 1726.)
  - C. glaucus, Willd. * (Eng. 1726.)
  - C. lævigatus, Willd. * (Eng. 1806.)
  - C. occidentalis, Hook. & Arn. * (Eng. 1831.)

Magnoliaceæ, Magnolia Family.

Illicium. Species a half dozen; 2 in our region.
I. Floridanum, Ellis. (Eng. 1771.)
I. parviflorum, Vent. (Eng. 1790.)
Liriodendron. 1 species.
L. tulipifera, Linn. * (Eng. 1688.) Variegated varieties are sold. A form called integrifolia is also catalogued.
Magnolia. Species about 15; America and Eastern Asia.
M. acuminata, Linn. * (Eng. 1736.) Largely used for stocks upon which to work other magnolias.
M. cordata, Michx. * (Eng. 1801.)
M. Fraseri, Walt. * (Eng. 1786.)
M. glauca, Linn. * (Eng. 1688.) A variety longifolia is catalogued.
M. grandiflora, Linn. * (Eng. 1737.)
M. macrophylla, Michx. * (Eng. 1800.)
M. Thompsoniana, Hort. * A hybrid between M. glauca and M. tripetala.
M. Umbrella, Lam. * or M. tripetala. (Eng. 1752.)
Schizandra. One of a half dozen species inhabits the United States.
S. coccinea, Michx. (Eng. 1806.)

Anonaceæ, Custard-Apple Family.

Anona. A tropical genus of 50 species, of which only one comes within our limits.
A. glabra, Linn. (A. laurifolia.) Reasoner. (Eng. 1774.)
Asimina. 7 or 8 species, American, 6 within our limits.
A. grandiflora, Dunal. Gill. 1881.
A. triloba, Dunal. * (Eng. 1736.)

Menispermaceæ, Moonseed Family.

Cocculus. 10 species; 2 American.
C. Carolinus, DC. (Eng.)
Menispermum. 2 species; 1 American.
M. Canadense, Linn. * (Eng. 1691.)

Berberidaceæ, Barberry Family.

Achlys. Species, 1.
A. triphylla, DC. Gill. 1881.
Berberis. About 50 species; 9 in our region.
B. Aquifolium, Pursh. * (Eng. 1825.) Long in cultivation.
B. Canadensis, Pursh. (Eng. 1759.) This has been catalogued in this country for many years, but the plants are probably all the European B. vulgaris, which is naturalized here.
B. nervosa, Pursh. U. S. Nurseries 1889. (Eng. 1826.)
B. repens, Lindley. (Eng. 1822.)
Caulophyllum. Species 1.*
C. thalictroides, Michx. (Eng. 1755.)
Diphylleia. Single species.
D. cymosa, Michx. Kelsey '90-'91. (Eng. 1812.)
Jeffersonia. Species 2; 1 American.
J. diphylla, Pers. * (Eng. 1792.)
Podophyllum. Species 2; 1 American.
P. peltatum, Linn. * (Eng. 1664.)
Vancouveria. Single species.
V. hexandra, Descne. *

Nymphæaceæ, Water-Lily Family.

Brasenia. Species 3 or 4; 1 American.
B. peltata, Pursh. *
Cabomba. Species 2 or 3; 1 in our limits.
C. Caroliniana, Gray. (Eng.)
Nelumbo. Species 2; 1 in America.
N. lutea, Pers. * (Eng. 1810.)
Nuphar. Species about a half dozen; 4 in our limits.
N. advena, Ait. f. * (Eng. 1772.)
N. advena var. minus, Morong. (N. luteum.)* (Eng.)
N. Kalmianum, Ait. (N. pumilum.) * (Eng.)
N. polysepalum, Engelm. Hors. 1889 (1883).
Nymphæa. About 20 species; 7 in this country.
N. elegans, Hook. Hors. 1889. (Eng. 1850.)
N. flava, Leitner. * (Eng. 1881.)
N. Mexicana, Zucc. *
N. odorata, Ait. * Gill. 1875. (Eng. 1786.)
N. odorata var. minor, Sims. *
N. odorata var. rosea. *

N. reniformis, DC. (N. tuberosa.) * (Eng.)

SARRACENIACEÆ, PITCHER-PLANT FAMILY.

Darlingtonia. Single species.
D. Californica, Torr. * (Eng. 1861.)
Sarracenia. Species 6: all American.
S. Drummondii, Croom. * (Eng. 1829.)
S. Drummondii var. alba. * (Eng.)
S. Drummondii var. rubra, Walter. * (Eng.)
S. flava, Linn. * (Eng. 1752.)
S. flava var. atrosanguinea. (Eng.)
S. flava var. Catesbæi. (Eng.)
S. flava var. limbata. (Eng.)
S. flava var. maxima. (Eng.)
S. flava var. ornata. (Eng. 1881.)
S. psittacina, Michx. * (Eng. 1866.)
S. purpurea, Linn. * (Eng. 1640.)
S. rubra, Walt. * (Eng. 1786.)
S. rubra var. acuminata. (Eng.)
S. variolaris, Michx. * (Eng. 1803.)

The following are English hybrids:
S. Atkinsoniana. S. flava var. maxima × S. purpurea. *
S. Chelsoni. S. rubra × S. purpurea. *
S. Courtii. S. purpurea × S. psittacina. *
S. crispata. Supposed to be a wild or natural hybrid between S. flava and S. rubra. *
S. excellens. S. variolaris × S. Drummondii.
S. exculta. Probably S. flava var. atrosanguinea × S. Drummondii.
S. exornata. S. purpurea × S. crispata.
S. formosa. S. psittacina × S. variolaris.
S. illustrata. S. flava × S. Stevensii.
S. Madisoniana. S. variolaris × S. psittacina. *
S. melanorhoda. S. Stevensii × S. purpurea. *
S. Mitchelliana. S. Drummondii var. rubra × S. purpurea. *
S. Moorei. S. flava × S. Drummondii.
S. Popei. S. flava × S. rubra.
S. Stevensii. S. flava × S. purpurea.
S. Swaniana. S. variolaris × S. purpurea. *
S. Tolliana. S. Drummondii var. alba × S. flava.
S. Williamsi. S. purpurea × S. flava. *

PAPAVERACEÆ, POPPY FAMILY.

Argemone. Four in this country; 6 or 7 in all.
A. hirsuta. (Eng. 1879.) Said by Dict. Gard. to have come from California. A. hispida?
A. hispida, Gray. Orcutt, 1891.
A. Mexicana, Linn. * (Eng. 1592.)
Canbya. Species 2, American.
C. candida, Parry. (Eng. 1876.) California.
Dendromecon. Species 2, American.
D. rigida, Benth. (Eng.)
Eschscholtzia. Species about 15, all North American.
E. cæspitosa, Benth. (Eng.)
E. Californica, Cham. * (Including E. crocea.) (Eng. 1790.) Much cultivated in this country. The form known as E. crocea appeared in England in 1833. Over a dozen varieties are in cultivation.
E. tenuifolia, Hook. * (Eng.)
Papaver. Some 14 species; 3 here.
P. Californicum, Gray. Henderson, 1891. Orcutt, 1891.
P. nudicaule, Linn. Many forms are in cultivation, all probably from the European plant.
Platystemon. Species 1, Californian.
P. Californicus, Benth. * (Eng. 1853.)
Platystigma. Species 3, North American.
P. lineare, Benth. (Eng. 1833.)
Romneya. Species 1, Californian.
R. Coulteri, Harvey. * (Eng. 1875). Of recent introduction.
Sanguinaria. Species single, North American.
S. Canadensis, Linn. * (Eng. 1680.)

Stylophorum. Four species; 1 in our region.
  S. diphyllum, Nutt. * (Eng. 1854.)

FUMARIACEÆ, FUMITORY FAMILY.
Adlumia. Species 1, North American.
  A. cirrhosa, Raf. * (Eng. 1788.)
Corydalis. About 70 species; 11 in our region.
  C. aurea, Willd. (Eng. 1685.)
  C. glauca, Pursh. Hors. 1889. (Eng. 1683.)
  C. Scouleri, Hook. Gill. 1881. (Eng. 1683.)
Dicentra. A dozen species, two-thirds in our region.
  D. Canadensis, DC. Gill. 1881. (Eng. 1822.)
  D. chrysantha, Hook. & Arn. Gill. 1881. (Eng. 1852.)
  D. Cucullaria, DC. Gill. 1881. (Eng. 1731.)
  D. eximia, DC. * (Eng. 1812.)
  D. formosa, DC. Gill. 1881. (Eng. 1796.)

CRUCIFERÆ, MUSTARD FAMILY.
Arabis. About 130 species, of which 38 occur within our limits.
  A. alpina, Linn. Wool. 1883. Native also to Europe, where it has been long in cultivation and whence the plant has probably come to us.
  A. alpina var. variegata. Wool. 1883.
  A. blepharophylla, Hook. & Arn. (Eng. 1874.)
Barbarea. A single species in our region; some 20 in all.
  B. vulgaris, R. Br. * A variegated variety is in cultivation; native also to Europe.
Cardamine. About 60 species; 18 in our region.
  C. angulata, Hook. Gill. 1881.
  C. pratensis, Linn. * A double-flowered variety is in cultivation, as well as other forms. Introduced into cultivation from Europe, where it is also native.
  C. rhomboidea, DC. (Eng.)
  C. rotundifolia, Michx. (Eng.)

Cheiranthus. A dozen species; one-third in our limits.
  C. asper, Cham. & Schlecht. (Eng. 1826.)
  C. Menziesii, Benth. & Hook. Gill. 1881. (Eng.)
Cochlearia. Five species in this region; 25 in all.
  C. officinalis, Linn.* Native also to Europe.
Dentaria. Seven species occur in our region.
  D. Californica, Watson. Gill. 1881.
  D. diphylla, Linn. Gill. 1881. (Eng. 1810.)
  D. laciniata, Muhl. Gill. 1881. (Eng. 1825.)
  D. maxima, Nutt. Gill. 1884.
  D. tenella, Pursh. Gill. 1881. (Eng. 1826.)
Draba. Species about 150; 32 within our limits.
  D. aurea, Vahl. (Eng. 1824.)
Erysimum. Species about 70; 5 in our territory.
  E. asperum, DC. (Eng. 1824.)
  E. asperum var. Arkansanum, Gray.* (E. Arkansanum.)
Leavenworthia. 4, North American.
  L. Michauxii, Torr. (Eng. 1868.)
Lesquerella. American; 27 species (includes species formerly referred to Vesicaria.)
  L. arctica, Wats. (Eng. 1828.)
  L. gracilis, Wats. (Eng. 1834.)
  L. grandiflora, Wats. (Eng. 1835.)
Parrya. Species about a dozen; 3 in our region.
  P. arctica, R. Br. (Eng. 1820.)
  P. nudicaulis, Regel. (Eng. 1883.)
Selenia. Species 2, American.
  S. aurea, Nutt. (Eng. 1881.)
Streptanthus. About 22 species, all American.
  S. hyacinthoides, Hook. (Eng. 1834.)
  S. maculatus, Nutt. (Eng. 1833.)
Vesicaria. See Lesquerella.

CAPPARIDACEÆ, CAPER FAMILY.
Cleome. Five species in our region; about 70 are known.

C. integrifolia, Torr. & Gray.* In cultivation perhaps a dozen years as "Rocky Mountain Bee-Plant."
Isomeris. Species 1, California.
I. arborea, Nutt. (Eng. 1839.)
Polanisia. About 15 kinds, 4 in our territory.
P. graveolens, Raf. (Eng.)

Cistaceæ, Rose-Rock Family.

Helianthemum. Over 100 species are described; 7 in our limits.
H. Canadense, Michx. (Eng. 1823.)
H. Carolinianum, Michx. (Eng.)
H. scoparium, Nutt. (Eng. 1848.)
Hudsonia. Species 3, all North America.
H. ericoides, Linn. (Eng. 1805.)
H. tomentosa, Nutt. (Eng. 1826.)

Violaceæ, Violet Family.

Viola. Species over 150; in our region 33.
V. Beckwithii, T. & G. Gill. 1881.
V. blanda, Willd. Gill. 1881. (Eng. 1802.)
V. blanda var. renifolia, Gray. Hors. 1889.
V. Canadensis, Linn. Gill. 1881. (Eng. 1783.)
V. canina, Linn. var. adunca, Gray. Gill. 1881.
V. canina, Linn. var. Muhlenbergii, Gray (var. sylvestris, Regel). Gill. 1881.
V. glabella, Nutt. Gill. 1881.
V. lanceolata, Linn. Gill. 1881. (Eng. 1759.)
V. lobata, Benth. Gill. 1881.
V. Nuttallii, Pursh. (V. aurea.) Gill. 1881.
V. palmata, Linn. *
V. palmata var. cucullata, Gray. (V. cucullata.) * (Eng. 1762.) There are white and variegated forms in cultivation.
V. pedata, Linn. * (Eng. 1759.)
V. pedata var. alba. *
V. pedata var. atropurpurea, (Eng.)
V. pedata var. bicolor, Pursh. * (Eng.)
V. pedunculata, T. & G. Gill. 1881. (Eng. 1856.)
V. præmorsa, Dougl. (Eng. 1828.)
V. primulæfolia, Linn. Gill. 1881.
V. pubescens, Ait. *
V. rostrata, Muhl. Gill. 1881.
V. rotundifolia, Michx. Gill. 1881. (Eng. 1800.)
V. sagittata, Ait. Gill. 1884. (Eng. 1775.)
V. sarmentosa, Dougl. Gill. 1881.
V. Selkirkii, Pursh. Gill. 1881. (Eng. 1873.)
V. Sheltonii, Torr. Gill. 1881.
V. striata, Ait. Kelsey, '91-'92. (Eng. 1772.)

Polygalaceæ, Milkwort Family.

Polygala. Some 200 species; 37 in our region.
P. paucifolia, Willd. Gill. 1881. (Eng. 1812.)
P. Senega, Linn. G. & H. 1891. (Eng.)

Caryophyllaceæ, Pink Family.

Arenaria. Over 130 species; in our territory 35.
A. aculeata, Wats. Hors. 1889.
A. Franklinii, Dougl. Gill. 1881.
A. Grœnlandica, Spreng. Gill. 1884.
A. macrophylla, Hook. Gill. 1881.
Cerastium. Species perhaps 100; 9 in our region.
C. alpinum, Linn. Native also to Europe, where it is cultivated.
Lychnis. Some 30 species; 11 in this country.
L. alpina, Linn. *
Silene. Over 400 ssecies described; in our region 46.
S. Californica, Durand. Gill. 1881.
S. Douglasii, Hook. Gill. 1881.
S. Hookeri, Nutt. (Eng. 1873.)
S. Lyallii, Watson. Gill. 1881.
S. Menziesii, Hook. Gill. 1881.
S. Pennsylvanica, Michx. * (Eng. 1806.)
S. regia, Sims. (Eng. 1811.)
S. Scouleri, Hook. Gill. 1881.
S. stellata, Ait. *
S. Virginica, Linn. * (Eng. 1783.)

Portulacaceæ, Portulaca Family.

Calandrinia. Species 60; a dozen within our limits.

C. caulescens, HBK., var. Menziesii, Gray. (C. speciosa.) * (Eng. 1831.)
A white-flowered variety is offered by Orcutt.
C. rosea. "A form in cultivation, presumed to have originated in California." Orcutt.
Claytonia. About 25 species; 20 here.
C. Caroliniana, Michx. Gill. 1881. (Eng.)
C. lanceolata, Pursh. (C. Caroliniana var. sessilifolia). Gill. 1881.
C. parvifolia, Moc. Gill. 1881.
C. perfoliata, Donn. * (Eng.)
C. Sibirica, Linn. Native also in the Old World, where it is in cultivation.
C. Virginica, Linn. * (Eng. 1768.)
Lewisia. Two North American species.
L. rediviva, Pursh. Gill. 1881. (Eng. 1826.)
Spraguea. Species single, Western American.
S. umbellata, Torr. * (Eng. 1858.)
S. umbellata var. caudicifera, Gray. Hors. 1889.
Talinum. About a dozen species; 8 in our region.
T. teretifolium, Pursh. (Eng. 1823.)

TAMARISCINEÆ, TAMARIX FAMILY.
Fouquiera. Three or 4 species, American.
F. formosa, HBK. (Eng.)
F. splendens, Engelm. Orcutt, 1891.

HYPERICACEÆ, ST. JOHN'S-WORT FAMILY.
Ascyrum. A half-dozen species.
A. amplexicaule, Michx. (Eng. 1823.)
A. Crux-Andreæ, Linn. Gill. 1881. (Eng. 1759.)
A. hypericoides, Linn. (Eng. 1759.)
A. stans, Michx. Gill 1881. (Eng. 1816.)
Elodes. There are two species in our region.
E. campanulata, Pursh. (E. Virginica.) Gill. 1881.
Hypericum. Over 150 species; in our region, 29.
H. Ascyron, Linn. (H. pyramidatum). * (Eng. 1764.)
H. aureum, Bartram. * (Eng.)
H. Buckleyi, M. A. Curtis. Wool. about 1889.
H. densiflorum, Pursh. Kelsey 1888.
H. elatum. Said by Dict. Gard. to have come from N. America (1762) is explained as follows: "H. elatum, Ait. Hort. Kew, iii. 104, proves to be H. hircinum, Linn., or some nearly related Old World species."—Coulter.
H. fasciculatum, Lam. Hors. 1889. Kelsey, 1890-'91.
H. formosum, HBK. var. Scouleri, Coulter. Gill. 1881.
H. Kalmianum, Linn. * (Eng. 1759.)
H. maculatum, Walt. (H. corymbosum.) Gill. 1881.
H. prolificum, Linn. * (Eng. 1758.)

TERNSTRŒMIACEÆ, TEA FAMILY.
Gordonia. Species 10; 2 in our limits.
G. Lasianthus, Linn. * (Eng. 1739.)
G. pubescens, L'Her. * (Eng. 1774.)
Stuartia. Species 3, of which two are American.
S. pentagyna, L'Her. * (Eng. 1785.)
S. Virginica, Cav. Kelsey, 1891-2. (Eng. 1743.)

CHEIRANTHODENDREÆ.
Fremontia. Single species.
F. Californica, Torr. (Eng. 1851.)

MALVACEÆ, MALLOW FAMILY.
Callirrhoë. Species 6 or 7, in North America.
C. involucrata, Gray. * C. involucrata var. lineariloba, Gray. *
C. pedata, Gray. *
Hibiscus. Upwards of 150 species; a dozen kinds in our region.
H. aculeatus, Walt. *
H. Californicus, Kellogg. * (Eng.)

H. coccineus, Walt. * (Eng.)
H. incanus, Wendl. *
H. militaris, Cav. * (Eng.)
H. Moscheutos, Linn. * (Eng.)
H. Moscheutos var. rosea. * There is also a white-flowered variety.
Malachra. A half dozen species; 2 in our region.
M. capitata, Linn. Reasoner.
Malvastrum. Some 60 species; one quarter of them here.
M. coccineum, Gray. * (Eng. 1811.)
M. coccineum var. grossulariæfolium, Torr. (Eng. 1835.)
M. Munroanum, Gray. (M. miniata, Sphæralcea Munroana, and "Sunset-Plant," of dealers.) Introduced 3 or 4 years ago.
Sida. About 80 species; 17 in U. S.
S. Elliottii, T. & G. Gill. 1881.
S. Napæa, Cav. (Eng.)
Sidalcea. Species 17, American.
S. campestris, Greene. Hors. 1889.
S. candida, Gray. * (Eng. 1882.)
S. malvæflora, Gray. (S. humilis.) Gill. 1881. (Eng. 1838.)
Sphæralcea. Some 25 species; ours are 16.
S. acerifolia, Nutt. * (Eng. 1861.)

TILIACEÆ, LINDEN FAMILY.
Tilia. Some 8 or 10 species; 3 American.
T. Americana, Linn. * (Eng. 1752.) Nurserymen have a var. macrophylla.
T. heterophylla, Vent. (Eng. 1811.)

LINACEÆ, FLAX FAMILY.
Linum. 22 in our region; about 80 in the world.
L. perenne, Linn. var. Lewisii, Eat. & Wright. (L. Lewisii.) *

ZYGOPHYLLACEÆ, BEAN-CAPER FAMILY.
Larrea. Species 4; 1 in our southwest.
L. Mexicana, Moric. (Eng.)

MALPIGHIACEÆ.
Byrsonima. About 90 species; one in our region.
B. lucida, HBK. (Eng. 1759.)
Malpighia. One species in our region; 20 in all.
M. glabra, Linn. (Eng. 1757.)

GERANIACEÆ, GERANIUM FAMILY.
Geranium. About 100 species; of which 90 occur here.
G. incisum, Nutt. Gill. 1881.
G. maculatum, Linn. * (Eng. 1732.)
G. Richardsoni, Fisch. & Mey. Gill. 1881.
G. Robertianum, Linn. Gill. 1881. Also European, where a white-flowered variety is catalogued.
Impatiens. About 135 species; 2 in our region.
I. fulva, Nutt. Kelsey, '90-'91. (Eng.)
I. pallida, Nutt. (Eng.)
Limnanthes. Four species, in Western America.
L. Douglasii, R. Br. * (Eng. 1833.)
Oxalis. Nearly 250 species; 13 in our territory.
O. Acetosella, Linn. Gill. 1881. Native in Europe, where it is also in cultivation.
O. Acetosella var. Oregana, Trelease. Gill. 1881.
O. corniculata, Linn., var. stricta, Sav. (Eng. 1658.)
O. Drummondii, Gray. *
O. violacea, Linn. * (Eng. 1772.) Long familiar as a window-garden plant.

RUTACEÆ, RUE FAMILY.
Ptelea. Two species in our region; 6 in all.
P. trifoliata, Linn. * (Eng. 1704.) There is a var. aurea.
Xanthoxylum. About 80 species; 5 in U. S.
X. Americanum, Mill. * (X. fraxineum.) (Eng. 1740.)
X. Pterota, HBK. (Eng. 1768.)

MELIACEÆ.
Swietenia. One species.
S. Mahogoni, Linn. Reasoner. (Eng. 1734.)

OLACINEÆ, OLAX FAMILY.
Ximenia. Four species; 1 in our region.
X. Americana, Linn. Reasoner. (Eng. 1759.)

LICINEÆ, HOLLY FAMILY.
Ilex. About 150 species; of which 14 grow in our region.

I. Cassine, Linn. Gill. 1881. (Eng. 1726.)
I. Dahoon, Walt. * (Eng. 1726.)
I. Dahoon var. myrtifolia, Chapm. (Eng, 1806.)
I. decidua, Walt. * (Eng.)
I. glabra, Gray. * (Eng. 1759.)
I. lævigata, Gray. * (Eng.)
I. mollis, Gray. (Eng.)
I. monticola, Gray. Kelsey, 1885.
I. opaca, Ait. * (Eng. 1744.)
I. verticillata. Gray. * (Eng. 1736.)
Nemopanthes. A single species, in North America.
N. fascicularis, Raf. (N. Canadensis.) * (Eng. 1802.)

CYRILLEÆ, CYRILLA FAMILY.
Cliftonia. Species 1, southern U. S.
C. nitida, Gaertn. (Mylocaryum ligustrinum.) (Eng.)
Cyrilla. Species 2 or 3, one in our region.
C. racemiflora, Linn. Gill. 1881. (Eng. 1765.)

CELASTRACEÆ, STAFF-TREE FAMILY.
Celastrus. Some 18 species; 1 American.
C. scandens, Linn. * (Eng. 1736.)
Euonymus. Forty species; 4 in our region.
E. Americanus, Linn. * (Eng. 1686.)
E. Americanus var. obovatus, T. & G. Gill. 1881.
E. atropurpureus, Jacquin. * (Eng. 1756.)
E. occidentalis, Nutt. Gill. 1881.
Myginda. Species 8; half within our limits.
M. latifolia, Swz. (Eng. 1795.)
Pachystima. Two species, American.
P. Canbyi, Gray. * (Eng.)
P. Myrsinites, Raf. Gill. 1881. (Eng. 1818.)

RHAMNACEÆ, BUCKTHORN FAMILY.
Berchemia. About 10 species; 1 ours.
B. volubilis, DC. * (Eng. 1714.)
Ceanothus. Species 37 in our region.
C. Americanus, Linn. * (Eng. 1715.)
C. collinus, said by Dict. Gard. to have been introduced into England in 1827 from N. America, is not identified.
C. cuneatus, Nutt. Gill. 1881. (Eng.)
C. dentatus, T. & G. (Eng. 1848.)
C. divaricatus, Nutt. Orcutt, 1891. (Eng. 1848.)
C. floribundus, Hook. (Eng.)
C. hirsutus, Nutt. Orcutt, 1891.
C. integerrimus, Hook. & Arn. * (Eng. 1846.)
C. microphyllus, Michx. (Eng. 1806.)
C. Orcuttii, Parry. Orcutt, 1891.
C. ovatus, Desf. G. & H., 1891.
C. papillosus, T. & G. (Eng. 1848.)
C. prostratus, Benth. Gill. 1881.
C. rigidus, Nutt. (Eng. 1848.)
C. sanguineus, Pursh. Gill. 1881.
C, thyrsiflorus, Esch. *
C. Veatchianus, Hook. (Eng.)
C. velutinus, Dougl. Gill. 1881.
Reynosia. One species in our region.
R. latifolia, Griseb. Reasoner.
Rhamnus. There are 60 species; 7 here.
R. alnifolia, L'Her. G. & H. 1891.
R. Californica, Esch. * (Eng. 1874.)
R. (Frangula) Caroliniana, Walt. *
R. crocea, Nutt (Eng. 1848.)
R. lanceolata, Pursh. *
R. Purshiana, DC. *
Zizyphus. Some 50 species; 3 in our region.
Z. Parryi, Torr. Orcutt, 1891.

VITACEÆ, VINE FAMILY.
Ampelopsis quinquefolia, Michx. * (Eng. 1629.) There are two or three named horticultural varieties.
Cissus. Three species in our region.
C. Ampelopsis, Pers. (Vitis indivisa.) *
C. incisa, Desm. (Vitis incisa.) Reasoner.
C. stans. Pers. (Vitis bipinnata.) *

- Vitis. About 230 species; 16 in our region.
  - V. æstivalis, Michx. * (Eng-1656.) Parent of Norton's Virginia and others.
  - V. Arizonica, Engelm. Munson 1889.
  - V. Berlandieri, Planchon. Munson, 1889.
  - V. bicolor, Le Conte. Munson, 1889.
  - V. Californica. Benth. Munson, 1889.
  - V. candicans, Engelm. Munson, 1889.
  - V. cinerea, Engelm. Munson, 1889.
  - V. cordifolia, Michx. Munson, 1889. (Eng. 1806.)
  - V. coriacea, Shuttl. Munson, 1889.
  - V. Doaniana, Munson. Munson, 1889.
  - V. Labrusca, Linn. * (Eng. 1656.) To this belong Concord, Niagara, and many others.
  - V. Linsecumii. Buckley. Mun- 1889.
  - G. monticola, Buckley, Munson. 1889.
  - V. Munsoniana, Simpson. Munson, 1889.
  - V. riparia, Michx. * Much used in Europe for anti-phylloxera stocks.
  - V. rotundifolia, Michx. (V. vulpina.) * (Eng.) Represented by the Thomas and others.
  - V. rubra, Michx. Munson, 1889.
  - V. rupestris, Scheele. Munson, 1889.
  - V. Simpsoni, Munson. Munson, 1889.
  - V. Solonis, Engelm. Munson, 1889.

Sapindaceæ, Soapberry Family.

- Acer. Over 50 species, of which we have 9.
  - A. circinatum, Pursh. * (Eng. 1827.)
  - A. dasycarpum, Ehrh. * (Eng. 1725.) There are about a half dozen cut-leaved and named varieties.
  - A. glabrum, Torr. * (Eng.)
  - A. macrophyllum, Pursh.* (Eng. 1812.
  - A. Pennsylvanicum, Linn. (A. striatum.) * (Eng. 1755.)
  - A. rubrum, Linn. * (Eng. 1656.) There are two or three cultivated varieties.
  - A. saccharinum, Wangh. * (Eng. 1755.) A. barbarum, Linn., is probably the oldest name.
  - A. saccharinum var. nigrum. T. & G. * (Eng. 1812.)
  - A. spicatum, Lam. * (Eng. 1750.)
- Æsculus. Species 14; 6 in our region.
  - Æ. Californica, Nutt. (Eng.)
  - Æ. flava, Ait. (Eng. 1764.)
  - Æ. glabra, Willd. (Æ. rubicunda.) * (Eng. 1821.)
  - Æ. parviflora, Walt. * (Æ., or Pavia, macrostachya.) (Eng. 1820.)
  - Æ. Pavia, Linn. * (Eng. 1711.)
- Cardiospermum. Species about 15; 2 in our territory.
  - C. Halicacabum, Linn. * (Eng.) The well-known Balloon-vine.
- Negundo. Species 2 to 4; 2 in our country.
  - N. aceroides, Moench. (N. faxinifolium.) * (Eng. 1688.) There is a variety crispum, in cultivation.
  - N. Californicum, T. & G.*
- Sapindus. Two; 40 in all.
  - S. Saponaria, Linn.*
- Staphylea. Species 4; one-half American.
  - S. Bolanderi, Gray. (Eng. 1883.)
  - S. trifolia, Linn. * (Eng. 1640.)
- Ungnadia. Species 1, Texan.
  - U. speciosa, Endl. * (Eng. 1850.)

Anacardiaceæ, Cashew Family.

- Rhus. Species 120; in our region 16.
  - R. Canadensis, Marshall. (R. aromatica.) * (Eng. 1773.)
  - R. Canadensis var. trilobata, Gray. (R. trilobata.) *
  - R. copallina, Linn. * (Eng. 1688.)
  - R. cotinoides, Nutt. Kelsey '90-'91. (?)
  - R. diversiloba, T. & G. Gill, 1881. (Eng.)
  - R. glabra, Linn. * (Eng. 1726.)

R. glabra var. laciniata. A frequent garden form which also occurs wild.
R. integrifolia, Benth. & Hook.*
R. ovata, Wats. Orcutt, 1891.
R. Toxicodendron, Linn. (Eng. 1640.)
R. typhina, Linn. * (Eng. 1629.) A variety laciniata is also catalogued by Manning.
R. venenata, D.C. * (Eng. 1713.)

LEGUMINOSÆ, PULSE FAMILY.
Acacia. Nearly 450 species, 13 in our region.
A. Farnesiana, Willd. * (Eng. 1656.)
Amorpha. 7 or 8 species in N. America.
A. canescens, Nutt. * (Eng. 1812.)
A. fruticosa, Linn. * (Eng. 1724.)
Amphicarphæa. About 8 species, 2 in our region.
A. monoica, Nutt. (Eng. 1781.)
Apios. Species 3, 1 American.
A. tuberosa, Moench. * (Eng. 1640.)
Astragalus. About 600 species have been described; 208 occur within our territory.
A. adsurgens, Pall. (Eng. 1818.) Also Siberian, whence it was introduced into England.
A. alpinus, Linn. Hors. 1889, (1888). Also European.
A. Canadensis, Linn. Hors. 1889. (Eng. 1732.)
A. hypoglottis, Linn. Also European, whence it has come into cultivation.
A. leucophyllus, Torr. & Gr. (Eng.)
A. Robbinsii, Gray. Hors. 1889 (1888).
Baptisia. About 16 species, all North American.
B. alba, R. Br. Gill. 1881. (Eng. 1724.)
B. australis, R. Br. (B. cærulea, B. confusa, B. exaltata, B. minor). * (Eng. 1758.)
B. lanceolata, Ell. Gill. 1881.
B. leucantha, Torr. & Gr. *
B. leucophæa, Nutt. Gill 1881. (Eng. 1870.)
B. perfoliata, R. Br. (Eng. 1793.)
B. simplicifolia, Croom. Kelsey '91-'92.
B. tinctoria, R. Br. Gill. 1881. (Eng. 1759.)
Cæsalpinia. About 40; 2 in this country.
C. Bonduc, Benth. & Hook. *
Canavalia. About a dozen species; 2 in our region.
C. obtusifolia, DC. (Eng. 1820.) Also Malabar.
Cassia. 400 species described, 21 curring in the United States.
C. Marilandica, Linn. * (Eng. 1723.)
Centrosema. One species in our region; 26 in the world.
C. Virginianum, Benth. *
Cercis. Species 4 or 5; 3 American.
C. Canadensis, Linn. * (Eng. 1730.)
C. occidentalis, Torr. *
Cladrastis. Species 2; 1 in our limits.
C. tinctoria, Raf. (Virgilea lutea.) * (Eng.)
Clitoria. About 30 species; 1 growing here.
C. Mariana, Linn. * (Eng. 1759.)
Dalea. Nearly 100 species, all American; 43 occur in our region.
D. alopecuroides, Willd. (Eng.)
Daubentonia. But one species in this country; 3 or 4 others.
D. punicea, DC. (Sesbania punicea.) (Eng. 1820.)
Desmodium. Species about 125; here there are 38.
D. Canadense, DC. (Eng. 1640.)
Erythrina. Some 25 kinds, 3 being in the U. S.
E. herbacea, Linn. * (Eng. 1724.)
Galactia. About 45 species, 16 in United States.
G. Elliottii, Nutt. Gill. 1881.
G. glabella, Michx. Gill. 1881.
Gleditschia. 4 or 5 species: 2 in our region.
G. aquatica (G. monosperma), Marsh. * (Eng. 1723.)
G. triacanthos, Linn. * (Eng. 1700.) A weeping variety is catalogued.
Glycyrrhiza. A dozen species; 1 in this country.

G. lepidota, Nutt. (Eng. 1817.)
Gymnocladus. Single species.
G. Canadensis, Lam. * (Eng. 1748.)
Hedysarum. A half hundred species; 2 in our region.
H. boreale, Nutt. Hors. 1889 (1888).
H. Mackenzii, Richards. Hors. 1889 (1888). (Eng. 1878.)
Hosackia. 3 species occur within our limits.
H. bicolor, Dougl. Gill. 1881. (Eng. 1823.)
H. crassifolia, Benth. Gill. 1881. (Eng.)
H. decumbens, Benth. Gill 1881.
Indigofera. Species about 220; 5 in this country.
I. Caroliniana, Walt. *
Lathyrus. Some 170 species have been described; 22 growing in our limits.
L. maritimus, Bigelow. * (Eng. 1826.)
L. ornatus, Nutt. Gill. 1881.
L. splendens, Kellogg. Henderson, 1890.
L. venosus, Muhl. Orcutt, 1891.
L. vestitus, Nutt. Orcutt, 1891.
Lespedeza. About 25 species; 8 are native to U. S.
L. reticulata, Pers. (Eng.)
L. violacea, Pers. *
Lupinus. About 100 species; three-fourths of them within our limits.
L. affinis, Agardh. Orcutt, 1891. (Eng. 1848.)
L. albcaulis, Dougl. Gill. 1881.
L. arboreus, Sims. Orcutt, 1891. Var. luteus is offered by Orcutt, 1891.
L. aridus, Dougl. (Eng. 1827.)
L. Chamissonis, Esch. Gill. 1881. (Eng. 1793 as L. albifrons; 1833 as L. Chamissonis.)
L. densiflorus, Benth. Orcutt 1891.
L. diffusus, Nutt. Gill. 1881.
L. laxiflorus, Dougl. (Eng. 1826.)
L. lepidus, Dougl. Gill. 1881. (Eng. 1826.)
L. leptophyllus, Benth. (Eng.)
L. leucophyllus, Dougl. Gill. 1881. (Eng. 1826.)
L. littoralis, Dougl. (Eng. 1826.)
L. micranthus, Dougl. Orcutt, 1891.
L. microcarpus, Sims. (Eng.)
L. nanus, Dougl. * (Eng. 1833.) There is a white form.
L. Nootkatensis, Donn. (Eng. 1794.)
L. ornatus, Dougl. Gill. 1881. (Eng. 1826.)
L. perennis, Linn. Gill. 1881. (Eng. 1658.)
L. polyphyllus, Lindl.* (Eng. 1826.)
Var. albiflorus is offered.
L. Sabinii, Dougl. (Eng. 1827.)
L. subcarnosus, Hook. * (Eng. 1835.)
L. sulphureus, Dougl. *
L. villosus, Willd. (L. pilosus.)*
Oxytropis. About 100 species; 16 in this country.
O. Lamberti, Pursh. (Eng. 1811.)
Parkinsonia. Five in our region.
P. aculeata, Linn. * (Eng. 1739.)
Petalostemon. There are 24 species in our region.
P. candidus, Michx. (Eng. 1811.)
P. decumbens, Nutt. Wool. about 1889.
P. violaceus, Michx. (Eng. 1811.)
Piscidia. One species.
P. Erythrina, Linn. * (Eng. 1690.)
Prosopis. Some 18 or 20 species; 3 in our region.
P. juliflora, DC. Orcutt, 1891.
P. pubescens, Benth. Orcutt, 1891.
Psoralea. About 100 kinds; 29 grow in this country.
P. lanceolata, Pursh. Gill. 1881.
P. melilotoides, Michx. (Eng. 1814.)
P. physodes, Dougl. Gill. 1881.
Robinia. 5 or 6 species; 4 in our region.
R. hispida, Linn. * (Eng. 1743.)
R. Pseudacacia, Linn. * (Eng. 1640.) There are many cultivated varieties.
R. viscosa, Vent. * (Eng. 1797.)
Schrankia. About 10 species; 4 in our territory.
S. uncinata, Willd. (Eng. 1789.)
Sesbania. 16 species; one-fourth within our limits.
S. vesicaria, Ell. (Eng. 1816.)

Sophora. About 25 species; 6 in United States.
  S. tomentosa, Linn. (Eng. 1739.)
Tephrosia. About 90 species; a dozen within our region.
  T. Virginiana, Pers. Gill. 1881. (Eng. 1765.)
Thermopsis. A dozen species; 7 in this country.
  T. Caroliniana, Curtis.*
  T. mollis, Curtis.*
  T. montana, Nutt. (Eng. 1818.)
Trifolium. Nearly 300 species have been described; 51 in our region.
  T. fucatum, Lindl. (Eng. 1824.)
  T. involucratum, Willd. (T. fimbriatum.) (Eng. 1825.)
  T. reflexum, Linn. (Eng. 1794.)
  T. repens, Linn.*
Vicia. Nearly 200 described species; in our region, 15.
  V. Americana, Muhl. Gill 1881.
  V. Caroliniana, Walt. Gill 1881.
  V. Cracca, Linn. Gill. 1881. Also European.
  V. gigantea, Hook, Gill. 1881.
Vigna. About 30 species, of which we have one.
  V. luteola, Benth. (V. glabra.) (Eng. 1685.)
Wistaria. Two or 3 species; 1 in America.
  W. frutescens, Poir. * (Eng. 1724.) There are 2 or 3 named horticultural varieties.
Zornia. 10 species; 2 in U. S.
  Z. tetraphylla, Michx. (Eng. 1824.)

ROSACEÆ, ROSE FAMILY.
Adenostoma. Two Californian species.
  A. fasciculatum. Hook. & Arn. Orcutt, 1891. (Eng. 1848.)
  A. sparsifolium, Torr. Orcutt, 1891.
Amelanchier. Four or 5 species; 3 here.
  A. alnifolia, Nutt. *
  A. Canadensis, T. & G. (Including var. Botryapium.) * (Eng. 1746.)
  A. Canadensis var. oblongifolia, Torr. & Gray. * Has been cultivated some 15 years as Dwarf Juneberry (see p. 51).
  A. Canadensis var. rotundifolia, Torr. & Gray. Kelsey, '86-'87. The three following are mentioned as varieties of A. Canadensis by Dict. of Gard.:
  var. florida. N. Am. 1826.
  var. ovalis. N. Am. (Eng. 1800.) (This is probably Pyrus nigra. See Gard.& For. iii. 440.)
  var. parvifolia.
  A. oligocarpa, Roem. Introduced in England in 1800 as A. sanguinea.
Chamæbatia. One species, Californian.
  C. foliolosa, Benth. (Eng. 1859.)
Chamæbatiaria. One species, Californian.
  C. (Spiræa) Millefolium, Maxim. (Eng. 1880.)
Chamærhodos. Species 4 or 5; 1 American.
  C, erecta, Bunge. (Eng. 1824.)
Chrysobalanus. Perhaps a half dozen species, of which we have 2.
  C. Icaco, Linn. * (Eng. 1752.)
  C. oblongifolius, Michx. (Eng. 1812.)
Cowania. Species 3; Californian and Mexican.
  C. Mexicana, D. Don. (Eng.)
Cratægus. From 50 to 75 species; 15 in this country.
  C. apiifolia, Michx. (Eng. 1812.)
  C. coccinea, Linn. * (Eng. 1683.)
  C. coccinea var. mollis, Torr. & Gray. (C. tomentosa var mollis.) *
  C. cordata, Aiton. * (Eng. 1738.)
  C. Crus-galli, Linn. * (Eng. 1691.)
  C. Crus-galli var. ovalifolia, Lindl. (Eng. 1810.)
  C. Crus-galli var. prunifolia, T & G. (Eng. 1818.)
  C. Douglasii, Lindl. * (Eng. 1827.)
  C. flava, Aiton. * (Eng. 1724.)
  C. parvifolia, Aiton. * (Eng. 1704.)
  C. punctata, Jacquin. (Eng. 1746.)
  C. spathulata, Michx. * (Eng. 1806.)
  C. tomentosa, Linn. * (Eng. 1765.)

Dalibarda. One or two species; 1 in America.
D. repens, Linn. Gill. 1881. (Eng. 1766.)
Dryas. Species 2; 1 in our region.
D. octopetala, Linn., var. Drummondii. Watson. (Eng. 1800.)
Eriogynia. Four species in our region.
E. (Spiræa) pectinata, Hook. (Eng.)
Fallugia. Species 1.
F. paradoxa, Endl. (Eng.)
Fragaria. A half dozen species; 4 in our region.
F. Chilensis, Duchesne. * Occasionally grown for many years.
F. vesca, Linn. * Various garden varieties, little known in this country, belong to this species; but they are of European origin, where the plant is also native.
F. Virginiana, Mill. * (Eng. 1629.) The supposed parent of the garden strawberries.
Geum. About 30 species; 14 native to U. S.
G. radiatum, Michx. Kelsey, '91-'92.
G. rivale, Linn. * A variety album is offered.
G. triflorum, Pursh. * (Eng.)
Gillenia. Species 2, North American.
G. stipulacea, Nutt. Kelsey, '91-92.
G. trifoliata, Moench. *
Heteromeles. One species in our region.
H. arbutifolia, Roemer. Orcutt. 1891.
Horkelia. There are 14 species in our region.
H. (Potentilla) congesta, Dougl. (Eng. 1826.)
Ivesia. There are 15 species within our limits.
I. Gordoni, T. & G. Gill. 1881.
I. unguiculata, Gray. (Eng.)
Neviusia. A single species, in Alabama.
N. Alabamensis, Gray. * (Eng. 1882.) This is of recent introduction.
Nuttallia. A single species, western American.
N. cerasiformis, T. & G. Gill. 1881. (Eng. 1848.)
Physocarpus. Species 4 or 5; 2 in our region.
P. opulifolius, Maxim. (Neillia opulifolia.) * (Eng. 1690.) There is a variety aurea.
Potentilla. About 120 species; in this country, 40.
P. arguta, Pursh. (Eng. 1826.)
P. fruticosa, Linn. *
P. glandulosa, Lindl. Gill. 1881.
P. gracillis, Dougl. Gill. 1881. (Eng. 1826.)
P. Pennsylvanica, Linn. (Eng. 1827.)
P. tridentata, Aiton. *
Prunus. About 100 species; 25 in our limits.
P. Americana, Marsh. * (Eng.) Many varieties are cultivated for fruit.
P. angustifolia, Marsh. (P. Chicasa.) * Cultivated in various varieties for its fruit.
P. Caroliniana, Aiton. *
P. demissa, Walt. Gill. 1881.
P. hortulana, Bailey. * Numerous varieties are in cultivation for fruit.
P. ilicifolia, Walp. Orcutt, 1891. (Eng.)
P. incana, Schw. Introduced sparingly during the last three or four years, for its possible value as a fruit plant, under the name of P. pumila. Grown also for ornament. This is the western representative of P. pumila, and its oldest name is not yet determined. P. incana of Schweinitz is used until an older one, if such exist, is found.
P. maritima, Wangh. * (Eng. 1800.) Bassett's American plum, grown for its fruit, belongs to this species.
P. Pennsylvanica, Linn. f. * (Eng. 1773.)
P. pumila, Linn. * (Eng. 1805.) Grown for ornament. A plant known in gardens as Cerasus pumila is not this species.
P. serotina, Ehrh. * (Eng.) There are three or four named garden varieties.

P. subcordata, Benth. Munson, 1889.
P. Virginiana, Linn. * (Eng. 1724.)
Purshia. Species single.
P. tridentata, DC. Gill. 1881. (Eng. 1826.)
Pyrus. About 50 species; 9 in this country.
P. Americana, DC. * (Eng. 1782.) The Rowan or European mountain-ash is frequently sold as this species.
P. angustifolia, Aiton. (Eng. (1750.)
P. arbutifolia, Linn. f. * (Eng. 1700.)
P. coronaria, Linn. * (Eng. 1724.) In cultivation as an ornamental plant.
P. Ioensis, Bailey. Sparingly in cultivation for its fruit.
P. nigra, Sargent. * Heretofore confounded with P. arbutifolia. (See Garden and Forest, iii. 416, 440.)
P. rivularis, Dougl. * Of recent introduction.
P. sambucifolia, Cham. & Schl.*
P. Soulardi, Bailey. * Cultivated some 20 years in the form of the Soulard crab.
Rosa. Many species; 17 enumerated in our region.
R. Arkansana, Porter. *
R. blanda, Aiton. * (Eng.) The Rosa blanda offered by most nurserymen is probably not the American species.
R. Californica, Cham. & Schl. Orcutt, 1891.
R. Carolina, Linn. * (Eng. 1726.)
R. foliolosa, Nutt. Wool. about 1889.
R. gymnocarpa, Nutt. * (Eng.)
R. humilis, Marsh. (Eng.)
R. lucida, Ehrh. * (Eng. 1724.)
R. nitida, Willd. * (Eng. 1807.)
R. Nutkana, Presl. *
R. pisocarpa, Gray. Gill. 1881. (Eng. 1877.)
R. setigera, Michx. * (Eng.) This is well known as a climbing rose.
Rubus. Between 100 and 200 species; 22 in this region.
R. Canadensis, Linn. (Eng. 1811.) Introduced in 1886 or 1887 in the form of the Windom dewberry.
R. Canadensis var. invisus, Bailey. First introduced from 1870-75 as the Bartel dewberry.
R. Canadensis var. roribaccus, Bailey. Introduced from 1875-80 as Lucretia dewberry.
R. cuneifolius, Pursh. (Eng. 1811.)
R. deliciosus, James. * (Eng. 1870.)
R. hispidus, Linn. G. & H. 1891.
R. leucodermis. Dougl. *
R. Nutkanus, Mocq. * (Eng. 1826.)
R. neglectus, Peck. * Shaffer, Philadelphia and other raspberries belong to this.
R. occidentalis, Linn. * (Eng. 1696.) The parent of the common garden black raspberries.
R. odoratus, Linn. * (Eng. 1700.)
R. spectabilis, Pursh. Gill. 1881. (Eng. 1827.)
R. strigosus, Michx. * (Eng.) Parent of the Cuthbert and probably other garden raspberries.
R. triflorus, Richards. (Eng.)
R. trivialis, Michx. Introduced from 1884-1890 as Fairfax, Manatee, Bauer and Wilson's White dewberries.
R. ursinus, Cham & Schl. Gill. 1881.
R. villosus, Aiton. * (Eng. 1777.) The parent of the garden blackberries.
R. villosus var. albinus, Bailey.* In cultivation for a few years in forms of the "White blackberry."
R. villosus var. frondosus, Torr.* In cultivation as Wilson, Jr., and perhaps under other names.
Spiræa. About 50 species, of which we have 8.
S. Aruncus, Linn. *.
S. betulæfolia, Pall. Gill. 1881.
S. discolor, Pursh. *
S. discolor, Pursh., var. ariæfolia, Wats. * (Eng.)

S. Douglasii, Hook. * (Eng.)
S. Douglasii, var. Nobleana, Wats. (Eng. 1859.)
S. Kamtschatica, Pall. Wool. about 1889.
S. lobata, Jacquin. * (S. palmata.) (Eng. 1765.)
S. salicifolia, Linn. *
S. tomentosa, Linn. * (Eng. 1736.)
Waldsteinia. Four species; half in our region.
W. fragaroides, Tratt. * (Eng. 1803.)

SAXIFRAGACEÆ, SAXIFRAGE FAMILY.
Astilbe. A half dozen species; 1 in America.
A. decandra, Don. (Eng. 1812.)
Bolandra. Species 2; Western American.
B. Oregana, Watson. Gill. 1881.
Carpenteria. Single species.
C. Californica, Torr. Orcutt, 1891. (Eng. 1880.)
Chrysosplenium. About 15 species; 3 in our limits.
C. Americanum, Schw. Gill. 1884.
Decumaria. A single species.
D. barbara, Linn. Gill. 1881. (Eng. 1785.)
Heuchera. About 25 species; 19 in our territory.
H. Americana, Linn. * (Eng. 1656.)
H. cylindrica, Dougl. Gill. 1881. (Eng. 1830.)
H. glabra, Willd. (Eng. 1827.)
H. hispida, Pursh. (Eng. 1826.)
H. micrantha, Dougl. Gill. 1881. (Eng. 1827.)
H. pubescens, Pursh. (Eng. 1812.)
H. rubescens, Torr. Gill. 1881.
H. sanguinea, Engelm. * Of recent introduction.
H. villosa, Michx. (Eng. 1812.)
Hydrangea. About 35 species; 3 in our country.
H. arborescens, Linn. * (Eng. 1736.)
H. quercifolia, Bartram. * (Eng. 1803.)
H. radiata, Walt. Kelsey, '88-'89.
Itea. Five species, of which we have one.
I. Virginica, Linn. * (Eng. 1744.)
Jamesia. Single species.
J. Americana, Torr. & Gray. (Eng. 1865.)
Mitella. About 12 species; 8 in this country.
M. caulescens, Nutt. Gill. 1881.
M. diphylla, Linn. Gill. 1881.
M. nuda, Linn. Gill. 1881.
M. trifida, Graham. Gill. 1881.
Parnassia. A dozen species; half in this country.
P. asarifolia, Vent. * (Eng. 1812.)
P. Caroliniana, Michx. * (Eng. 1802.)
P. fimbriata, Koenig. Gill. 1881. (Eng.)
P. parviflora, DC. (Eng. 1820.)
Philadelphus. Species 12; 7 in the U. S.
P. Gordonianus, Lindl. * (Eng.)
P. grandiflorus, Willd. * (Eng. 1811.)
P. grandiflora var. laxus, T. & G. * (Eng. 1830.)
P. hirsutus, Nutt. (Eng. 1820.)
P. inodorus, Linn. * (Eng. 1738.)
P. Lewisii, Pursh. Gill. 1881. (Eng. 1739.)
P. microphyllus, Gray. * (Eng. 1883.)
Ribes. Sixty or 70 species; 32 in this country.
R. aureum, Pursh. * (Eng. 1812.) Grown both for ornament and for fruit. The Crandall currant belongs here.
R. aureum var. tenuiflorum, Torr. (Eng. 1812.)
R. cereum, Dougl. Gill. 1881. (Eng. 1827.)
R. Cynosbati, Linn. G. & H., 1891. (Eng. 1759.)
R. divaricatum, Dougl. (Eng. 1826.)
R. floridum, L'Her. * (Eng. 1729.)
R. gracile, Michx. (Eng. 1826.)
R. lacustre, Poir. (Eng. 1812.)
R. lacustre var. parvulum, Gray. Gill. 1881.
R. Lobbii, Gray. Gill. 1881. (Eng.)
R. oxyacanthoides, Linn. * (Eng. 1705.) Parent of Houghton, Downing and other American gooseberries.

R. prostratum, L'Her, G. & H., 1891. Possibly the R. alpinum of nurserymen.
R. Roezlii, (Eng. 1879,) in Dict. Gard. is not identified with American species.
R. rotundifolium, Michx. Kelsey, '91-'92.
R. sanguineum, Pursh. * (Eng. 1826.) A double-flowered variety is in cultivation.
R. speciosum, Pursh. (Eng. 1829.)
R. viscosissimum, Pursh. Gill. 1881.
Saxifraga. Species 160 or more, of which we have 46.
S. adscendens, Linn. (Eng. 1732.)
S. aizoides, Linn. Hors. 1889.
S. aizoon, Jacq. * (Eng. 1731.)
S. bronchialis, Linn. (Eng. 1819.)
S. bronchialis, var. cherlerioides, Eng. Gill. 1881.
S. cæspitosa, Linn. Gill. 1881.
S. Engleri. Said by Dict. Gard. (Suppl.) to come from North America; is not identified with any of our species.
S. integrifolia, Hook. Gill. 1881.
S. leucanthemifolia, Michx. Kelsey, '91-'92. (Eng. 1812.)
S. Mertensiana, Bongard. (S. heterantha.) Gill. 1881.
S. nivalis, Linn. *
S. oppositifolia, Linn. Hors. 1889.
S. peltata, Torr. * (Eng. 1873.)
S. Pennsylvanica, Linn. Hors. 1889. (Eng. 1732.)
S. Virginiensis, Michx. * (Eng. 1790.)
Suksdorfia. Single species of northwest U. S.
S. violacea, Gray, Gill. 1881.
Sullivantia. Species 2, North American.
S. Oregana, Watson. Gill. 1881.
Tellima. Seven species, North American.
T. grandiflora, R. Br. Gill. 1881. (Eng. 1826.)
T. parviflora, Hook. Gill. 1881.
Tiarella. Five species; 3 in our limits.
T. cordifolia, Linn. Gill. 1881. (Eng. 1731.)
T. trifoliata, Linn. Gill. 1881.
T. unifoliata, Hook. Gill. 1881.
Tolmiea. One species, from northwest America.
T. Menziesii, T. & G. Gill. 1881. (Eng. 1812.)
Whipplea. Two species, American.
W. modesta, Torr. Gill. 1881.

CRASSULACEÆ, ORPINE FAMILY.
Cotyledon. About 60 described species; 15 in our territory.
C. edulis, Brewer. (Eng. 1883.)
Sedum. 120 species; 24 in this country.
S. debile, Watson. Gill. 1881.
S. Douglasii, Hook. Gill. 1881.
S. Nevii, Gray. Gill. 1881.
S. obtusatum, Gray. Gill. 1881. (Eng.)
S. Oreganum, Nutt. Gill. 1881.
S. pulchellum, Michx. * (Eng. 1874.)
S. rhodanthum, Gray. (Eng.)
S. spathulifolium, Hook. Gill. 1881. (Eng. 1873.)
S. stenopetalum, Pursh. Gill. 1881. (Eng. 1877.)
S. telephioides, Michx. Kelsey, 1891-92. (Eng. 1810.)
S. ternatum, Michx. Gill. 1881. (Eng. 1789.)
S. variegatum, Watson. Wool. 1883.

DROSERACEÆ, SUNDEW FAMILY.
Dionæa. Species 1; southeastern U. S.
D. muscipula, Ellis. * (Eng. 1788.)
Drosera. Upwards of 100 species; 7 here.
D. filiformis, Raf. Gill. 1881. (Eng. 1811.)
D. intermedia, Hayne, var. Americana, DC. (D. longifolia.) Gill. 1881.
D. rotundifolia, Linn. *

HAMAMELIDEÆ, WITCH-HAZEL FAMILY.
Fothergilla. Species single.
F. Gardeni, Linn. (L. alnifolia.) * (Eng. 1765.)
Hamamelis. Species 2; 1 American, 1 Japanese.
H. Virginiana, Linn. * (Eng. 1736.)

Liquidambar. Species 2; 1 American, 1 Asian.
  L. Styraciflua, Linn * (Eng. 1681.)

HALORAGEÆ, WATER-MILFOIL FAMILY.

Myriophyllum. Ten species in our region; 15-20 in all.
  M. heterophyllum, Michx. *
Proserpinaca. Two species, American.
  P. palustris, Linn. (Eng. 1818.)
  P. pectinacea, Lam. (Eng. 1821.)

COMBRETACEÆ.

Conocarpus. Single species.
  C. erectus, Linn. (Eng. 1752.)
Terminalia. Nearly 100 species; only one indigenous in our region.
  T. Buceras, Benth. & Hook. (Eng. 1793.)

MYRTACEÆ, MYRTLE FAMILY.

Calyptranthes. Some 75 species; one with us.
  C. Chytraculia, Swz. (Eng. 1778.)
Eugenia. Some 700 species; there are 7 in our region.
  E. buxifolia, Willd. Reasoner (Eng. 1818.)

MELASTOMACEÆ, MELASTOMA FAMILY.

Rhexia. Species 9, North American.
  R. ciliosa, Michx. * (Eng. 1812.)
  R. lutea, Walt. Gill. 1881.
  R. Mariana, Linn. Gill. 1881. (Eng. 1759.)
  R. Virginica, Linn. Gill. 1875. (Eng. 1759.)

LYTHRACEÆ, LOOSESTRIFE FAMILY.

Decodon. We have a single species.
  D. (Nesæa) verticillatus, Ell. *
Lythrum. A dozen or more species; 11 in this region.
  L. alatum, Pursh. (Eng. 1812.)

ONAGRACEÆ, EVENING-PRIMROSE FAMILY.

Circæa. 3 species.
  C. Lutetiana, Linn. Kelsey, '91-'92.
  C. Pacifica, Asch. & Mag. Gill. 1881.
Clarkia. Four species, Western American.
  C. elegans, Lindl. * (Eng. 1833.) This and the next are very common in gardens. Variable.
  C. pulchella, Pursh. * (Eng. 1826.)
Epilobium. Some 50 species; 40 in our region.
  E. angustifolium, Linn. (E. spicatum.) *
  E. obcordatum, Gray. (Eng.)
Eucharidium. Species 2, Californian.
  E. concinnum, Fisch. & Mey. * (E. grandiflorum.) (Eng. 1787.)
Gaura. Species about 20, American; 14 in our region.
  G. biennis, Linn. (Eng. 1762.)
  G. Lindheimeri, Eng. & Gray. * (Eng. 1850.)
  G. parviflora, Dougl. (Eng. 1835.)
Godetia. There are 15 species in our territory.
  G. amœna, Lilj. * (Eng. 1826 as Œ. amœna; 1835 as Œ. vinosa), also known as G. rubicunda.
  G. amœna, var. rubicunda. (Eng. 1834.)
  G. grandiflora, Lindl. (Œnothera Whitneyi.) (Eng. 1870.)
  G. purpurea, (Œnothera purpurea), Watson. (Eng. 1794.)
  G. quadrivulnera, Spach. Orcutt, 1891.
  G. Romanzovii, Spach. (Œnothera Romanzovii.) (Eng. 1817.)
Jussiæa. About 30 species; we have 6.
  J. repens, Linn. var. grandiflora, Micheli. (Eng. 1812.)
Ludwigia. Species over 20, of which we have 18.
  L. alternifolia, Linn. Gill. 1881.
Œnothera. 100 or more species; 62 in our limits.
  Œ. albicaulis, Nutt. (Œ. pallida.) (Eng. 1826.)
  Œ. biennis, Linn. * (Eng.)
  Œ. biennis, var. grandiflora, Linn. (Œ. grandiflora: Œ. Lamarckiana.) (Eng. 1778.)
  Œ. bistorta, Nutt. *
  Œ. bistorta, Nutt., var. (?) Veatchiana, Hook. (Eng.)

Œ. cæspitosa, Nutt., (Œ. eximia.) (Eng. 1811, as Œ. cæspitosa; 1870 as Œ. eximia.)
Œ. Californica, Watson. Gill. 1881.
Œ. cardiophylla, Torr. (Eng. 1883.)
Œ. Drummondii, Hook. *
Œ. fruticosa, Linn. * (Eng. 1737.) A variety major is in cultivation.
Œ. fruticosa var. linearis (Œ. riparia of some dealers; Watson. Gill. 1881. (Eng.)
Œ. glauca, Michx. (Eng. 1812.)
Œ. glauca Michx., var. Fraseri, T. & G. (Œ. Fraseri) * (Eng. 1811.)
Œ. heterophylla, Spach. (Œ. bifrons.) (Eng. 1835.)
Œ. Missouriensis, Sims. * (Eng. 1811.)
Œ. pumila, Linn. (Œ. riparia.) * (Eng. 1757.)
Œ. rosea, Ait. *
Œ. speciosa, Nutt. * (Eng. 1821.)
Œ. tetraptera, Cav. *
Œ. triloba, Nutt. (Eng. 1822.)
Zauschneria. Species single, Californian.
Z. Californica, Presl. Gill. 1881.

LOASACEÆ, LOASA FAMILY.

Eucnide. There are 3 species in our limits.
E. bartonioides, Zucc. (Mentzelia bartonioides.) * (Eng. 1849.)
Mentzelia. Over 30 species; 21 in our limits.
M. lævicaulis, Torr. & Gray. (Eng.)
M. Lindleyi, Torr. & Gray. (Bartonia aurea.) * (Eng. 1854.)
M. nuda, Torr. & Gray. (Bartonia nuda.) (Eng. 1811.)
M. oligosperma, Nutt. (Eng. 1812.)
M. ornata, Torr. & Gray. (Eng. 1811.)

PASSIFLORACEÆ, PASSION-FLOWER FAMILY.

Carica. One species; 20 in all.
C. Papaya. Linn. * (Eng. 1690.)
Passiflora. About 120 species, of which we have 9.
P. incarnata, Linn. * (Eng. 1629.)
P. lutea, Linn. (Eng. 1714.)

CUCURBITACEÆ, GOURD FAMILY.

Echinocystis. About 15 species; 1 in our region.
E. lobata, Torr. & Gray. *
Megarrhiza. One species in our region.
M. Californica, Torr. (Eng. 1880.)

CACTACEÆ, CACTUS FAMILY.

Anhalonium. We have 2 species.
A. fissuratum, Engelm. *
A. Williamsii, Engelm. *
Cereus. Some 200 species; 30 within the United States. (Includes Echinocereus.)
C. Berlandieri, Engelm. *
C. cæspitosus, Engelm. *
C. chloranthus, Engelm. *
C. conoideus, Bigelow. *
C. ctenoides, Engelm. * (Eng.)
C. dasyacanthus, Engelm. *
C. dubius, Engelm. *
C. Emoryi, Engelm. *
C Engelmanni, Parry. *
C. enneacanthus, Engelm. * (Eng.)
C. Fendleri, Engelm. *
C. giganteus, Engelm. *
C. gonacanthus, Engelm. & Bigel. *
C. Greggii, Engelm. *
C. gumminosus. "A new species from California." — Blanc, 1891. Orcutt, 1891.
C. longisetus, Engelm. *
C. paucispinus, Engelm. *
C. pectinatus, Engelm. *
C. pectinatis var. rufispinus. *
C. phœniceus, Engelm. *
C. procumbens, Engelm. *
C. Rœtteri, Engelm. *
C. stramineus, Engelm. *
C. tuberosa, Poselger. *
C. viridiflorus, Engelm. *
Echinocactus. Some 200 have been described, of which we have 21.
E. bicolor, Galeotti. *
E. brevihamatus, Engelm. *
E. cylindraceus, Engelm. *
E. Emoryi, Engelm. * (Eng.)
E. horizonthalonius. Lemaire. *
E. intertextus, Engelm. *
E. Johnsoni, Parry. * (Eng.)
E. longihamatus, Galeotti. * (Eng. 1836.)

  - E. polycephalus, Engelm. & Big. (Eng. 1886.)
  - E. Scheerii, Salm. *
  - E. setispinus, Engelm. *
  - E. Simpsoni, Engelm. * (Eng. 1876.)
  - E. sinuatus, Dietr. (E. Treculianus.) *
  - E. Texensis, Hoepf. * (Eng.)
  - E. uncinatus, Hoepf. *
  - E. viridescens, Nutt. *
  - E. Wislizeni, Engelm., var. Lecontei, Engelm. (E. Lecontei.)*
- Echinocereus. Included with Cereus.
- Mamillaria. Some 300 species, of which 25 come within the limits of United States.
  - M. Arizonica, Engelm. *
  - M. bicolor, Lehm. (M. nivea.) * (Eng. 1835.)
  - M. chlorantha, Engelm. (Eng. 1883.)
  - M. dasyacantha, Engelm. *
  - M. deserti, Engelm. Orcutt, 1891.
  - M. Echinus, Engelm. *
  - M. filipendula, Engelm. *
  - M. Goodridgii, Scheer. *
  - M. Grahami, Engelm. *
  - M. Heyderi, Muhlenpf. (M. applanata.)* (Eng.)
  - M. lasiacantha, Engelm. *
  - M. macromeris, Engelm. *
  - M. meiacantha, Engelm. *
  - M. micromeris, Engelm. var. Greggii, Engelm. * (Eng.)
  - M. Missouriensis, Sweet. (M. Nuttallii.) *
  - M. pectinata, Engelm. *
  - M. phellosperma, Engelm. Orcutt, 1891.
  - M. Pottsii, Scheer. (Eng. 1840.)
  - M. pusilla, DC. * (Eng. 1820.)
  - M. pusilla var. Texana, Engelm. (Eng.)
  - M. recurvata, Engelm. (M. re curvispina.)*
  - M. sphærica, Dietr. *
  - M. vivipara, Haworth (M. radi osa.) * (Eng.)
  - M. Wrightii, Engelm. *
- Opuntia. Species over 150; with in our limits, 46.
  - O. arborescens, Engelm. *
  - O. arbuscula, Engelm. *
  - O. basilaris, Engelm. & Bigel. (Eng.)
  - O. Bernardina, Engelm. *
  - O. Bigelovii, Engelm. * (Eng.)
  - O. Camanchica, Engelm. & Big.*
  - O. clavata, Engelm. *
  - O. echinocarpa, Engelm. & Bigel. * (Eng.)
  - O. Emoryi, Engelm. *
  - O. Engelmanni, Salm. * (Eng. 1854.)
  - O. filipendula, Engelm. *
  - O. fulgida, Engelm. *
  - O. Kleiniæ, DC. * (Eng.)
  - O. Missouriensis, DC. * (Eng. 1814.)
  - O. Pes-corvi, Le Conte. * (Eng.)
  - O. prolifera, Engelm. *
  - O. Rafinesquii, Engelm. * (Eng. 1868.)
  - O. Rafinesquii, var. macrorhiza, Engelm. (Eng.)
  - O. rufida, Engelm. *
  - O. serpentina, Engelm. Orcutt, 1891.
  - O. Tuna-manse. "A related form or variety [to O. Tuna.] with nearly globular orange fruit, blotched with red."—Orcutt, 1891. Native?
  - O. vulgaris, Mill. * (Eng. 1596.)
  - O. Whipplei, Engelm. & Bigel. *

FICOIDEÆ.

- Sesuvium. Four species; 2 in our region.
  - S. Portulacastrum, Linn. (Eng. 1692.)

UMBELLIFERÆ, PARSLEY FAMILY.

- Angelica. About 20 species; 18 here.
  - A. Curtisii, Buckl. Kelsey, '91-'92.
- Carum. About 50 species; 4 in this country.
  - C. Gairdneri, Benth. & Hook. Gill. 1881.
- Erigenia. Single species.
  - E. bulbosa, Nutt. Gill. 1881.
- Eryngium. Over 150 described species, with 24 here.
  - E. Leavenworthii, Torr. & Gray. *
  - E. yuccæfolium, Michx. (C. aquaticum.) * (Eng. 1699.)
- Leptotænia. Species 7, American.
  - L. dissecta, Gray. (Ferula dissoluta.) Gill. 1881.
  - L. mutifida, Nutt. (Ferula multifida.) Gill. 1881.

Ligusticum. Some 20 kinds, of which 9 grow in this country.
  L. actæifolium, Michx. Kelsey, 1890.
Osmorhiza. About 8 species; 6 in our region.
  O. nuda, Torr. Gill. 1881.
  O. (Glycosma) occidentalis, Nutt. Gill. 1881.
Peucedanum. Over 100 species; in our region 48.
  P. dasycarpum, T. & G. Gill. 1881.
  P. Hallii, Watson. Gill. 1881.
  P. leiocarpum, Nutt. Gill. 1881.
  P. simplex, Nutt. Gill. 1881.
  P. triternatum, Nutt. Gill. 1881.
Sanicula. Species about 15; in this country 10.
  S. bipinnatifida, Dougl. Gill. 1881.
  S. Marylandica, Linn. Gill. 1881.
  S. Menziesii, Hook. & Arn. Gill. 1881.
Thaspium. Three species, in our region.
  T. aureum, Nutt. *
  T. aureum, Nutt., var. trifoliatum, C. & R. (Thaspium trifoliatum.) Kelsey, 1890.
Tiedemannia. There are 4 species in this region.
  T. rigida, Coulter & Rose. Kelsey, '90-'91.
Zizia. A couple species in our region.
  Z. aurea, Koch, var. Bebbii, Coulter & Rose. Kelsey, '90-'91.

ARALIACEÆ GINSENG FAMILY.
Aralia. Some 30 species are described, about one-third North American.
  A. Californica, Watson. Gill. 1881.
  A. hispida, Vent. Gill. 1881.
  A. nudicaulis, L. Gill. 1881. (Eng. 1731.)
  A. quinquefolia, Dec. & Planch. Gill. 1881. (Eng. 1740.) Coming to be grown for its medicinal root.
  A. racemosa, Linn. * (Eng. 1658.)
  A. spinosa, Linn. * (Eng. 1688.)
  A. trifolia, Dec. & Planch. Gill. 1881.

Fatsia. 3 species, America and Japan; 1 in our region.
  F. horrida, Benth & Hook. (Eng. 1829.)

CORNACEÆ, DOGWOOD FAMILY.
Cornus. Twenty-five or more species; 18 in this country.
  C. alternifolia, Linn. f. *
  C. alternifolia var. argentea, Temple & Beard 1890.
  C. Canadensis, Linn. Gill. 1881. (Eng. 1774.)
  C. circinata, L'Her. * (Eng. 1784.)
  C. florida, Linn. * (Eng. 1731.) A red-flowered variety has been in cultivation five or six years. There is also a weeping form.
  C. paniculata, L'Her. * (Eng. 1758.)
  C. sericea, Linn. * (Eng. 1683.)
  C. stolonifera, Michx. * (Eng. 1741.)
  C. stricta, Lam. * (Eng. 1758.)
Garrya. Species 8; 6 in our limits.
  G. elliptica, Dougl. (Eng. 1818.)
  G. Fremontii, Torr. (Eng.)
Nyssa. Six or 8; 4 in our region.
  N. aquatica, Linn. (Nyssa multiflora). * (Eng. 1824). There is a weeping variety sold.
  N. Ogeche, Marsh. (Nyssa capitata.) (Eng.)

CAPRIFOLIACEÆ, HONEYSUCKLE FAMILY.
Diervilla. Species about 7; in this country 3.
  D. sessilifolia, Buckl. Kelsey 1887.
  D. trifida, Moench. * (Eng. 1739.)
Linnæa. Single species.
  L. borealis, Gronov. G. & H. 1891.
Lonicera. Nearly 100 kinds; 15 in our region.
  L. cærulea, Linn. * Native to both America and Europe, and probably cultivated entirely from European sources.
  L. ciliata, Muhl. Gill. 1881. (Eng. 1824.)
  L. ciliosa, Poir. Gill. 1881.
  L. flava, Sims. * (Eng. 1810.)

L. glauca Hill. (L. parviflora) Kelsey 1889. (Eng.)
L. grata, Ait. Gill. 1881.
L. hirsuta, Eaton. (Eng. 1822.)
L. hispidula, Dougl. Gill. 1881.
L. involucrata, Banks. Gill. 1881. (Eng. 1833.)
L. oblongifolia, Muhl. G. & H. 1891.
L. sempervirens, Ait. * (Eng. 1656.)
L. Sullivantii, Gray. *

Sambucus. Species about a dozen; we have 5.
S. Canadensis, Linn. * (Eng. 1761.) Introduced in 1890 as an edible fruit bearing plant. (See page 52;) also ANNALS for 1890, 166, under Elderberry.)
S. glauca, Nutt. Orcutt 1891.
S. racemosa, Linn. (Sambucus pubens). * (Eng. 1812.)

Symphoricarpos. Seven species in our limits.
S. occidentalis, Hook. * (Eng.)
S. racemosus, Michx. * (Eng. 1817.)
S. racemosus var. pauciflorus, Robbins. G. & H. 1891.
S. vulgaris, Michx. * (Eng. 1730.) There is also a variegated-leaved variety.

Triosteum. Two species in our region and 1 in Asia.
T. perfoliatum, Linn. (Eng. 1730.)

Viburnum. Nearly 100 species; we have 14.
V. acerifolium, Linn. * (Eng. 1736.)
V. cassinoides, Linn. * (Eng. 1761.)
V. dentatum, Linn. * (Eng. 1763.)
V. ellipticum, Hook. Gill. 1881.
V. lantanoides, Michx. * (Eng. 1820.)
V. Lentago, Linn. * (Eng. 1761.)
V. molle, Michx. * (Eng. 1812.)
V. nudum, Linn. * (Eng. 1752.)
V. Opulus, Linn. * Also European.
V. prunifolium, Linn. * (Eng. 1731.)
V. pubescens, Pursh. G. & H. 1891.

RUBIACEÆ, MADDER FAMILY.

Bouvardia. Two species in our region; 26 in all.
B. triphylla, Salisb. (Eng. 1794.)
Catesbæa. A half dozen species; one in our limits.
C. parviflora, Swz. (Eng. 1810.)
Cephalanthus. About 6 kinds: 1 in this country.
C. occidentalis, Linn. * (Eng. 1735.)
Chiococca. About 8 species; 1 in our limits.
C. racemosa, Linn. *
Erithalis. About a half dozen species, of which we have one.
E. fruticosa, Linn. (Eng. 1793.)
Exostema. 20 species; one in our region.
E. Caribæum, Roem. & Schult. (Eng. 1780.)
Galium. Some 200 or 250 species; 37 in our region.
G. boreale, Linn. *
Genipa. One species here; 8 in all.
G. clusiæfolia, Griseb. *
Guettarda. Nearly 50 species; 2 in our limits.
G. scabra, Lam. (Eng. 1818.)
Hamelia. Six or 8 species; 1 in our region.
H. patens, Jacq. * (Eng. 1752.)
Houstonia. Twenty species described, of which 14 are ours.
H. cærulea, Linn. Gill. 1881. (Eng. 1785.)
H. purpurea, Linn. Gill. 1881.
H. serpyllifolia, Michx. Wool. 1883.
Mitchella, Two species; 1 American, 1 Japanese.
M. repens, Linn. Gill. 1881. (Eng. 1761.)
Pinckneya. Species single, American.
P. pubens, Michx. (Eng. 1786.)
Psychotria. About 500 species; 2 in Florida.
P. undata, Jacq. *
Randia. About 90 species; a single one in this territory.
R. aculeata, Linn. (Eng. 1733.)

VALERIANCEÆ, VALERIAN FAMILY.

Valerianella. A half hundred species, of which we have a dozen.

V. congesta, Lindl. (Plectritis congesta.) (Eng. 1826.)

COMPOSITÆ, COMPOSITE OR SUNFLOWER FAMILY.

Achillea. About 100 species, of which we have 3.

A. asplenifolia (Eng. 1803), of Dict. Gard., is probably a rose-colored form of A. Millefolium and is evidently not American.

A. Millefolium, Linn. * Also native to Europe, whence the cultivated forms have probably come.

A. Ptarmica, Linn. * Probably introduced into cultivation from Europe, where it is also native.

Actinella. 16 species in our region.

A. grandiflora, Torr. & Gray. (Eng.)

Actinomeris. 9 or 10 species; of ours, 2.

A. squarrosa, Nutt. (A. procera of Dict. Gard.) (Eng. 1640 and 1766.)

Ageratum. There are 3 species in our region; 16 in all.

A. corymbosum, Zuccagni. (A. cælestinum.) *

Anaphalis. About 25 species; we have 1.

A. margaritacea, Benth. & Hook. Gill. 1881.

Antennaria. There are a dozen species in our region.

A. alpina, Gaertn. Gill. 1881.

A. dimorpha, Torr. & Gr. Gill. 1881.

A. dioica, Gaertn. *

A. Geyeri, Gray. Gill. 1881.

A. racemosa, Hook. Gill. 1881.

Aplopappus. Species 60; in our region, 45.

A. lanuginosus, Gray. Hors. 1889.

A. spinulosus, DC. (Eng. 1874.)

Arnica. About 20 species; 15 in U. S.

A. amplexicaulis, Nutt. Gill. 1881.

A. Chamissonis, Less. (Eng.)

A. cordifolia, Hook. Gill. 1881.

A. foliosa, Nutt. Gill. 1881. (Eng.)

A. latifolia, Bong. Gill. 1881.

Artemisia. Some 200 are described, of which 44 occur within our limits.

A. cana, Pursh. (Eng. 1800.)

A. Canadensis, Michx. *

A. frigida, Willd. Wool. 1883.

A. Ludoviciana, Nutt. *

A. Stelleriana, Bess. Manning, about 1890.

A. tridentata, Nutt. Gill. 1881.

Aster. An extensive genus, especially in America, 128 species being native within our limits.

A. acuminatus, Michx.* (Eng. 1806.)

A. alpinus, Linn. *

A. amethystinus, Nutt. (A. pilosus.) (Eng. 1812.)

A. Andersoni, Gray. Gill. 1881.

A. Bigelovii, Gray. (A. Townshendii.) * (Eng. 1878.)

A. canescens, Pursh. Gill. 1881. (Eng. 1812.)

A. Carolinianus, Walt. Gill. 1881.

A. Chamissonis, Gray. Gill. 1881.

A. Chapmani, Torr. & Gray. Wool. 1883.

A. concinnus, Willd. (Eng. 1800.)

A. concolor, Linn. Gill. 1881. (Eng. 1759.)

A. conspicuus, Lindl. Hors. 1889.

A. cordifolius, Linn. * (Eng. 1759.)

A. corymbosus, Aiton. Hors. 1889.

A. Cusickii, Gray. Hors. 1889.

A. diffusus, Aiton.* (Eng. 1777; 1758 as A. pendulus.

A. Douglasii, Lindl. * (Eng.)

A. Drummondii, Lindl. *

A. dumosus, Linn.* (Eng. 1734.)

A. dumosus, Linn. var. albus. (Eng.)

A. dumosus, var. violaceus. (Eng.)

A. elegans, Torr. & Gray. (Eng. 1790.)

A. ericoides, Linn. * (Eng. 1758.)

A. ericoides, var. Reevesii, Gray. (A. Reevesi.) (Eng.)

A. falcatus, Lindl. Gill. 1881.

A. foliaceus, Lindl. (Eng. 1732.)

A. grandiflorus, Linn. * (Eng. 1720.)

A. Herveyi, Gray. * Of very recent introduction.

A. hyssopifolius, of Dict. Gard. recorded as American, is not' from this country. It is a species of Galatella.
A. integrifolius, Nutt. Gill. 1881.
A, lævis, Linn. Hors. 1889. (Eng. 1758.)
A. linariifolius, Linn. * (Eng. 1699.)
A. Lindleyanus. Torr. & Gray. *
A linifolius, of Dict. Gard., said to have come from this country (1759), is a species of Galatella and is not American.
A. longifolius (A. floribundus), Lam. * (Eng. 1776, as A. æstivus; 1798 as A. longifolius.) Manning catalogues a variety formosissimus.
A. macrophyllus, Linn. * (Eng. 1739.)
A. Menziesii, Lindl. Gill. 1881.
A. multiflorus (A. ciliatus), Ait.* (Eng. 1732.)
A. nemoralis, Ait. Gill. 1881.
A. Novæ-Angliæ, Linn. * (Eng. 1710; 1789 as A. spurius?)
A. Novæ-Angliæ, var. rubra. (Eng. 1812.) A variety rosea is in cultivation.
A. Novi-Belgii, Linn. *
A. Novi-Belgii, Linn., var. lævigatus, Gray. (A serotinus.) (Eng. 1710; 1794 as A. lævigatus.)
A. oblongifolius, Nutt.*
A. paniculatus, Lam. * (A. bellidiflorus; A. dracunculoides; A. laxus, A. simplex.) (Eng. 1640.)
A. patens, Aiton. (A. amplexicaulis.) * (Eng. 1773.)
A. patulus, Willd. (A. præcox.) (Eng. 1800.)
A. peregrinus, Pursh. (Eng.)
A. polyphyllus, Willd. *
A. prenanthoides, Muhl.*
A. ptarmicoides, Torr. & Gray.*
A. pulchellus, Eaton. Hors. 1889.
A. puniceus, Linn. *
A. puniceus, Linn., var. lævicaulis, Gray. (Eng. 1710; 1800 as A. blandus.)
A. puniceus, var. lucidulus, Gray (var. vimineus.) *
A. radulinus, Gray. Gill. 1881.
A. reticulatus, Pursh. (Eng. 1812.)
A. sagittifolius, Willd. *
A. salicifolius, Aiton.* (A. eminens, A. obliquus, also A. carneus.) (Eng. 1760.)
A. sericeus, Vent. * (Eng. 1802; 1801 as A. argenteus.)
A. Shortii, Hook. * (Eng.)
A. Sibiricus, Linn. *
A. spectabilis, Aiton. * (Eng. 1777.)
A. surculosus, Michx. *
A. tardiflorus, Linn. (Eng. 1775.)
A. Tradescanti, L. Gill. 1881. (Eng. 1633; 1800 as A. fragilis.)
A. turbinellus, Lindl. * (Eng.)
A. umbellatus, Mill. (A. amygdalinus.) (Eng. 1759.)
A. undulatus, Linn. Hors. 1889. (Eng. 1699.)
A. versicolor, Willd. * (Eng. 1790.)
Baccharis. About 275 species; 20 in our region.
B. halimifolia, Linn. * (Eng. 1683.)
Baeria. 20 species in our region.
B. (Actinolepis) coronaria, Gray. Orcutt 1891.
B. chrysostoma, Fisch. & Mey. (Eng. 1855.)
B. gracilis, Gray. (Eng. 1887.) Orcutt, 1891.
Bahia. About 20 species, of which 11 are ours.
B. (Villanova) chrysanthemoides, Gray. (Eng. 1878.)
Balsamorhiza. 8 species in our limits; a dozen in all.
B. Hookeri, Nutt. Gill. 1881.
Berlandiera. 5 in our region.
B. tomentosa, Nutt. Gill. 1881.
Bigelovia. There are 31 species in our limits.
B. graveolens, Gray. *
B. nudata, DC. (Eng.)
B. paniculata, Gray. (Eng.)
Boltonia. We have 3 species.
B. asteroides, L'Her. * (B. glastifolia.) (Eng. 1758.)
B. latisquama, Gray. *
Brachychæta. Single species.
B. cordata, T. & G. Wool. about 1889.
Cacalia. There are 9 species within our region.
C. atriplicifolia, Linn. (Eng.)
C. reniformis, Muhl. (Eng. 1801.)

C. suaveolens, Linn. (Eng. 1752.)
C. tuberosa, Nutt. (Eng.)
Cacaliopsis. A single species.
C. Nardosmia, Gray (Adenostyles Nardosmia, Gray.) Gill. 1881.
Centaurea. Of 400 species, we have 1.
C. Americana, Nutt. * (Eng. 1824.)
Centauridium. See Xanthisma, this family.
Chænactis. Species 20.
C. artemisiæfolia, Gray. Orcutt, 1891.
C. Douglasii, Hook. & Arn. Gill. 1881.
C. tenuifolia, Nutt. Orcutt, 1891.
Chaptalia. Species 3, out of about 20, in our region.
C. tomentosa, Vent. Gill. 1881. (Eng. 1806.)
Chrysogonum. A half dozen species; 1 in our region.
C. Virginianum, Linn. (Eng.)
Chrysopsis. Thirteen species belong to us out of about 20.
C. falcata, Ell. (Eng.)
C. Mariana, Nutt. (Eng.)
C. trichophylla, Nutt. (Eng. 1827.)
C. villosa, Nutt. (Eng.)
Cnicus. About 200 described species; we have 39.
C. altissimus, Willd. (Eng. 1726.)
C. altissimus, var. discolor, Gray. (Eng. 1803.)
C. undulatus, Gray. (Eng.)
Coreopsis. About 60 species; 28 in this country.
C. aristosa, Michx. (Eng. 1869.)
C. aurea, Aiton. * (Eng.)
C. auriculata, Linn. * (Eng. 1699.)
C. coronata, Hooker. (Eng. 1835.)
C. delphinifolia, Lam. *
C. Drummondii, Torr. & Gray. (Calliopsis Drummondii.) * (Eng. 1834.) Common in gardens.
C. grandiflora, Nutt. (Calliopsis grandiflora, Coreopsis longipes.) * (Eng. 1826.)
C. lanceolata, Linn. * (Eng. 1724.)
C. nudata, Nutt. (Eng. 1879.)
C. palmata, Nutt. *
C. rosea, Nutt. * (Eng.)
C. tinctoria, Nutt. * (Eng.)
C. trichosperma, Michx. (Calliopsis trichosperma.) *
C. tripteris, Linn. * (Eng.)
C. verticillata, Linn. * (Eng. 1780.)
Cosmidium Burridgeanum of the gardens is a hybrid of Thelesperma filifolium and Coreopsis tinctoria, acquiring its brown-purple rays from the latter.—Gray.
Echinacea. We have 2 species.
E. angustifolia, DC. * (Eng. 1861.)
E. purpurea, Moench. * (Eng. 1799.)
Engelmannia. Single species.
E. pinnatifida, Torr. & Gray. (Eng. 1881.)
Erigeron. About 100 species, of which we have 76.
E. bellidifolius, Muhl. *
E. glabellus, Nutt. (Eng.)
E. glaucus, Ker. * (Eng. 1812.)
E. grandiflorus, Hook. (Eng. 1819.)
E. macranthus, Nutt. *
E. ochroleucus, Nutt. Gill. 1881.
E. salsuginosus, Gray. (Aster salsuginosus.) (Eng. 1827.)
E. salsuginosus, var. elatior. (Eng.)
E. speciosus, DC. (Stenactis speciosa.) * (Eng.)
Eriophyllum. We have 12 species.
E. cæspitosum, Dougl. (Bahia lanata.) Gill. 1881. (Eng.)
Eupatorium. A genus of over 400 species; 38 in our region.
E. ageratoides, Linn. (E. Fraseri.)* Gill. 1881. (Eng. 1640.)
E. album, Linn. Gill. 1881.
E. altissimum, Linn. *
E. aromaticum, Linn. (Eng. 1739.)
E. aromaticum, Linn., var. melissoides, Gray. (E. cordatum.) *
E. cœlestinum, Linn. *
E. perfoliatum, Linn. *
E. purpureum, Linn. * (Eng. 1640.)

- Gaillardia. Ten species in our limits.
  - G. amblyodon, Gay. * (Eng. 1873.)
  - G. aristata, Pursh. Gill. 1881. (Eng. 1832.)
  - G. pulchella, Foug. (G. Drummondii.) * (Eng.)
  - G. pulchella, var. picta, Gray. (D. picta.) * Very common in gardens.
- Gnaphalium. About 100 species, of which ours are 15.
  - G. decurrens, Ives. (Eng.)
- Grindelia. Twenty species; 14 ours.
  - G. hirsutula, Hook. & Arn. (G. hirsuta of dealers ?)
  - G. squarrosa, Dunal. * (Eng. 1811.)
  - G. squarrosa, var. grandiflora, Gray. (Eng. 1851.)
- Gymnolomia. Nearly 20 species; 4 ours.
  - G. multiflora, Benth. & Hook. (Eng.)
- Helenium. Twenty in our region.
  - H. autumnale, Linn. (H. grandiflorum, H. pumilum.) * (Eng. 1729.)
  - H. Bolanderi, Gray. *
  - H. Hoopesii, Gray. * (Eng.)
  - H. nudiflorum, Nutt. (Eng.)
  - H. quadridentatum, Labill. (Eng. 1790.)
- Helianthus. Forty-three species are native in our region.
  - H. angustifolius, Linn. *
  - H. annuus, Linn. (H. multiflorus of most dealers.) * (Eng. 1596, 1827 as H. lenticuris.)
  - H. argophyllus, Torr. & Gray. * (Eng.) (See ANNALS for 1890, 168 for record of a cultivated form.)
  - H. atrorubens, Linn. * (Eng. 1732.)
  - H. Californicus, DC. *
  - H. debilis, Nutt., var. cucumerifolius, Gray. (H. cucumerifolius.) *
  - H. decapetalus, Linn. *
  - H. decapetalus var. multiflorus, Gray.* This Helianthus multiflorus (not the common one?—see H. annuus) is, according to Gray, "known only in cultivation from early times; must have been derived from H. decapetalus." Several garden forms of H. decapetalus are offered.
  - H. divaricatus, Linn. *
  - H. doronicoides, Lam. *
  - H. giganteus, Linn. *
  - H. lætiflorus, Pers. Manning, 1891.
  - H. Maximiliani, Schrad. *
  - H. mollis, Lam. * (Eng. 1805.)
  - H. orgyalis, DC. * (Eng. 1879.)
  - H. rigidus, Desf. * (Eng.) Garden varieties are offered.
  - H. strumosus, Linn. *
  - H. tracheliifolius, Willd. *
  - H. tuberosus, Linn. * (Eng. 1617.) Long grown as Jerusalem Artichoke.
- Heliopsis. Four species, all in our region.
  - H. lævis, Pers. * (Eng. 1714.)
- Hulsea. Species 6.
  - H. nana, Gray. Hors. 1889.
- Iva. 11 American species.
  - I. frutescens, Linn. *
- Krigia. Five species, American.
  - K. amplexicaulis, Nutt. (Cynthia Virginica. Gill. 1881.
- Kuhnia. Two species, American.
  - K. eupatorioides, Linn. (Eng. 1812.)
- Lasthenia. Four species; 3 in our region.
  - L. glaberrima, DC. (Eng. 1834.)
  - L. glabrata, Lindl. (L. Californica.) * (Eng. 1834.)
- Layia. Fourteen species, all American.
  - L. Calliglossa, Gray. (Eng.)
  - L. (Oxyura) chrysanthemoides, Gray. (Eng. 1834.)
  - L. elegans, Torr. & Gray. *
  - L. platyglossa, Gray. (Eng. 1836.)
- Lepachys. Four species in our region.
  - L. (Rudbeckia) columnaris, Torr. & Gray., var. pulcherrima, Torr. & Gray. (Obeliscaria pulcherrima.) * (Eng. 1811.)
  - L. (Rudbeckia) pinnata, Torr. & Gray. * (Eng. 1803.)
- Leptosyne. Seven species in our limits.
  - L. calliopsidea, Gray. (Eng. 1873.)

L. Douglasii, DC. Orcutt, 1891.
L. maritima, Gray. Orcutt, 1891.
Liatris. A North American genus of 16 species. (See also Trilisia, this family.)
L. Chapmanii, Torr. & Gray. Wool. 1883.
L. cylindracea, Michx. Wool. 1883.
L. elegans, Willd. * (Eng. 1787.)
L. gracilis, Pursh. Wool. 1883.
L. graminifolia, Willd. Gill. 1881. (Eng. 1838.)
L. graminifolia var. dubia, Gray. (Eng.)
L. pycnostachya, Michx. * (Eng. 1732.)
L. scariosa, Willd. * (Eng. 1739.)
L. spicata, Willd. * (Eng. 1732.)
L. squarrosa, Willd. * (Eng. 1732.)
L. tenuifolia, Nutt. Wool. 1883.
Lindheimera. A single species, Texan.
L. Texana, Gray & Engelm. (Eng.)
Madia. Nine or ten species, American.
M. elegans, Don. * (Eng. 1831.)
M. Nuttallii, Gray. Gill. 1881.
Marshallia. A genus of 4 North American plants.
M. cæspitosa, Nutt. Wool. 1883. (Eng. 1837.)
Matricaria. Species about 20; 2 in our region.
M. inodora, Linn. var., fl. pl. Wool. 1883.
Melanthera. Three species in our region; about 8 are known.
M. deltoidea, Michx. (Eng. 1799.)
M. hastata, Michx. (Eng. 1732.)
Mikania. Two species, out of 60, in our region.
M. scandens, Willd. Gill. 1881.
Monolopia. We have 5 species.
M. major, DC. (Eng. 1834.)
Palafoxia. A half dozen species; we have 2.
P. linearis, Lag. (Eng.)
Parthenium. A half dozen in our region.
P. Hysterophorus, Linn. (Eng.)
Pectis. About 40 species; a dozen here.
P. angustifolia, Torr. (Eng. 1865.)
Pentachæta. Five in our region.
P. aurea, Nutt. Orcutt, 1891. (Eng. 1884.)
Petasites. A dozen species; 4 in our territory.
P. (Nardosmia) palmata, Gray. Gill. 1881.
Polymnia. A dozen species; 2 in our region.
P. Canadensis, Linn. (Eng. 1768.)
P. Uvedalia, Linn. (Eng. 1699.)
Polypteris. There are 4 species in our limits.
P. (Palafoxia) Hookeriana, Gray. * (Eng. 1865.)
Prenanthes. Species 20; 11 in this country. (Includes Nabalus.)
P. alba, Linn. (Eng. 1762.)
P. virgata, Michx. (Eng. 1823.)
Rudbeckia. Over 25 species; we have 21.
R. amplexicaulis, Vahl. *
R. bicolor, Nutt. *
R. fulgida, Aiton, Kelsey, '90-'91. (Eng. 1760.)
R. grandiflora, C. C. Gmelin. (Eng. 1830.)
R. hirta, Linn. Gill. 1881. (Eng. 1714.)
R. laciniata, Linn. *
R. maxima, Nutt. * (Eng.)
R. speciosa, Wend. * (Eng.)
R. triloba, Linn. (Eng. 1699.)
Senecio. 800 to 900 species; we have 61.
S. ampullaceus, Hook. (Eng. 1834.)
S. aureus, Linn. Gill. 1881.
S. Bolanderi, Gray. Gill. 1881.
S. fastigiatus, Nutt. Gill. 1881.
S. lugens, Richards. Gill. 1881.
S. lugens, var. exaltatus, Gray. Gill. 1881.
Sericocarpus. Five species, all American.
S. conyzoides, Nees. (Eng. 1778.)
S. rigidus, Lindl. Gill. 1881.
S. solidagineus, Nees. (Eng. 1699.)
Silphium. A dozen species, American.
S. albiflorum, Gray. (Eng.)
S. integrifolium, Michx. Gill. 1881.
S. laciniatum, Linn. Gill. 1881. (Eng.)
S. perfoliatum, Linn. * (Eng.)

- S. terebinthinaceum, Linn. Gill. 1881. (Eng.)
- S. trifoliatum, Linn. (Eng.)

- Solidago. We have 74 species; a few others in other parts of the world.
  - S. cæsia, Linn. G. & H. 1891.
  - S. Canadensis, Linn. *
  - S. Canadensis, var. procera, Torr. & Gray. * (Eng. 1648.)
  - S. confertiflora, DC. Gill. 1881. (S. humilis var. confertiflora of Gillett.)
  - S. Drummondii, Torr. & Gray. * (Eng. 1885.)
  - S. elliptica, Aiton, var. axilliflora, Gray. (Eng.) "Cultivated from ante-Linnæan times in European collections, not identified in North America, but doubtless of American origin."—Gray.
  - S. elongata, Nutt. Gill. 1881.
  - S. juncea, Aiton. *
  - S. lanceolata, Linn. * (Eng. 1758.)
  - S. latifolia, Linn. *
  - S. Missouriensis, Nutt. *
  - S. multiradiata, Aiton. (Eng. 1776.)
  - S. nemoralis, Aiton. Hors. 1889.
  - S. occidentalis, Nutt. *
  - S. odora, Aiton. * (Eng. 1699.)
  - S. patula, Muhl. (Eng. 1805.)
  - S. petiolaris, Ait. *
  - S. puberula, Nutt. G. & H. 1891.
  - S. rigida, Linn. * (Eng. 1710.)
  - S. rugosa, Mill. * (Eng. 1686.)
  - S. sempervirens, Linn. * (Eng. 1699.)
  - S. serotina, Aiton. * (Eng. 1758.)
  - S. Shortii, Torr. & Gray. Wool. 1883.
  - S. speciosa, Nutt. (Eng. 1817.)
  - S. stricta, Aiton. Wool. 1883.
  - S. ulmifolia, Muhl.*
  - S. Virgaurea, Linn., var. alpina, Bigel. *
- Stevia. A half dozen species in our region; 100 in all.
  - S. serrata, Cav. * (Eng. 1827.) Well-known in greenhouses.
- Stokesia. Single species.
  - S. cyanea, L'Her. * (Eng. 1766.)
- Tanacetum. About 30 species; we have 7.
  - T. Huronense, Nutt. (Eng.)
- Taraxacum. We have a single species; several have been described.
  - T. officinale, Weber. (T. Dens-Leonis.) Gill. 1884. Long grown as a kitchen-garden vegetable from European sources, where it is also native.
- Tetradymia. Six species, all American.
  - T. canescens, DC. Gill. 1881.
- Tetragonotheca. Three species, American.
  - T. helianthoides, Linn. (Eng. 1726.)
- Trilisa. Species 2, Atlantic states.
  - T. odoratissima, Cass. (Liatris odoratissima.) Gill. 1881. (Eng. 1786.)
- Troximon. We have 17 species.
  - T. glaucum, Nutt. (Eng. 1811.)
- Verbesina. Fifty species described; 9 in our region.
  - V. occidentalis, Walt. (Actinomeris alata.) (Eng. 1803.)
  - V. Virginica, Linn. (Eng. 1812.)
- Veronia. About 380 species; of which we have 10.
  - V. fasciculata, Michx. Wool. 1883.
  - V. Lindheimeri, Gray & Engelm. Wool, about 1889.
  - V. Noveboracensis, Willd. * (Eng. 1710.)
- Wyethia. A dozen species, American.
  - W. angustifolia, Nutt. (Eng.)
- Xanthisma. Single species, Texan.
  - X. Texanum, DC. (Centauridium Drummondii.) * (Eng. 1877.)
- Xanthocephalum. Eight species; 2 in our region.
  - X. gymnospermoides, Benth. & Hook. (Eng. 1859.)
- Zinnia. About a dozen species; 5 in our limits.
  - Z. pauciflora, Linn. (Eng. 1753.)

LOBELIACEÆ, LOBELIA FAMILY.

- Downingia. About 10 species; 8 in our region. (Also known as Clintonia; but that name belongs to the Liliaceæ.)
  - D. elegans, Torr. (Eng. 1827.)
  - D. pulchella, Torr. * (Eng. 1827.)
- Lobelia. About 200 species described; we have 24.

  - L. amœna, Michx. (Eng. 1812.)
  - L. cardinalis, Linn. * (Eng. 1626.)
  - L. glandulosa, Walt. (Eng. 1840.)
  - L. Kalmii, Linn. (Eng. 1820.)
  - L. puberula, Michx. (Eng.)
  - L. splendens, Willd. Gill. 1881.
  - L. syphilitica, Linn. * (Eng. 1666.)
- Palmerella. One species, Californian.
  - P. debilis, Gray, var. serrata, Gray. Gill. 1881.

CAMPANULACEÆ, CAMPANULA OR BELLFLOWER FAMILY.

- Campanula. About 230 species have been described; we have 16.
  - C. Americana, Linn. Kelsey '90-'91. (Eng. 1763.)
  - C. divaricata, Michx. Kelsey '90-'91.
  - C. planiflora, Lam. (C. nitida.) (Eng. 1731.) "Long ago described from cultivated specimens, vaguely attributed to North America, is wholly unknown in a wild state; apparently allied to C. persicæfolia, and not N. American."—Gray.
  - C. rotundifolia, Linn. *
  - C. Scouleri, Hook. Gill. 1881. (Eng. 1876.)
- Specularia. Eight species; half in our region.
  - S perfoliata, A. DC. (Eng. 1680.)

ERICACEÆ, HEATH FAMILY.

- Andromeda. We have 8 species.
  - A. (Lyonia) ferruginea, Walt. (Eng. 1774.)
  - A. floribunda, Pursh. * (Eng. 1812.)
  - A. ligustrina, Muhl. * (Eng. 1748: Lyonia ligustrina.)
  - A. Mariana, Linn. Gill. 1881. (Eng. 1736: Pieris Mariana.)
  - A. nitida, Bartr. Gill. 1881. (Eng. 1765: Pieris nitida.)
  - A. phillyreifolia, Hook. (Eng. 1842.)
  - A. polifolia, Linn. *
  - A. (Zenobia) speciosa, Michx. * (Eng. 1800.)
- Arbutus. About 10 species described; we have 2.
  - A. Menziesii, Pursh. * (Eng. 1827.)
- Arctostaphylos. Something like 20 species, of which we have 18.
  - A. bicolor, Gray. Orcutt 1891.
  - A. glauca, Lindl. *
  - A. Manzanita, Parry. Orcutt 1891.
  - A. Nevadensis, Gray. Gill. 1881
  - A. Pringlei, Parry. Orcutt 1891.
  - A. pungens, HBK. *
  - A. tomentosa, Dougl. * (Eng. 1826.)
  - A. Uva-ursi, Spreng. *
- Azalea. See Rhododendron.
- Bejaria. Over a dozen species; 1 in our region.
  - B. racemosa, Vent.* (Eng. 1810.)
- Calluna. Species single.
  - C. vulgaris, Salisb. *
- Cassandra. Single species.
  - C. calyculata, Don. Gill. 1881. (Eng. 1748.)
  - C. calyculata, var. angustifolia, Gray. (Eng. 1748.)
- Cassiope. About a dozen species; 5 in our region.
  - C. hypnoides, Don. (Eng. 1798.)
- Chimaphila. About 4 species; we have 3.
  - C. maculata, Pursh. Gill. 1881. (Eng. 1752.)
  - C. umbellata, Nutt. Gill. 1881.
- Chiogenes. Species single.
  - C. serpyllifolia, Salisb. (C. hispidula, Torr. & Gr.) Gill. 1881.
- Clethra. About 25 species; 2 in our region.
  - C. acuminata, Michx. * (Eng. 1806.)
  - C. alnifolia, Linn. * Sold for several years by nurserymen. (Eng. 1751, as C. alnifolia; 1770 as C. paniculata; 1806 as C. scabra.)
  - C. alnifolia, var. tomentosa, Michx. (Eng. 1731.)
- Elliottia. Species 3; 1 American.
  - E. racemosa, Muhl. (Eng.)
- Epigæa. 2 species; 1 Japanese, 1 American.
  - E. repens, Linn. Gill. 1881. (Eng. 1736.)
- Gaultheria. About 90 species; 4 in our region.
  - G. Myrsinites, Hook. Gill. 1881.
  - G. procumbens, Linn. Gill. 1884.

G. Shallon, Pursh.* (Eng. 1826.)
Gaylussacia. About 40 species; 6 in our region.
G. dumosa, Torr. & Gray. * (Eng. 1774.)
G. frondosa, Torr. & Gray. * (Eng. 1761.)
G. resinosa, Torr. & Gray. * (Eng. 1782.)
G. ursina, Torr. & Gray. Kelsey 1889.
Kalmia. A half dozen species; we have 5.
K. angustifolia, Linn. * (Eng. 1736.)
K. angustifolia, var. aurea, Temple & Beard 1890.
K. cuneata, Michx. (Eng. 1820.)
K. glauca, Aiton. Gill. 1881.
K. hirsuta, Walt. Kelsey '90'-91. (Eng. 1786.)
K. latifolia, Linn. * (Eng. 1734.)
K. latifolia, var. crispa, Temple & Beard 1890.
Ledum. 4 or 5 described, of which we have 3.
L. glandulosum, Nutt. (Eng.)
L. latifolium, Ait. (L. Canadense.) * (Eng. 1763.)
Leiophyllum. Species 2; 1 here.
L. buxifolium, Ell. * (Eng. 1736.)
Leucothoë. We have 6 out of 8 or 10 species,
L. acuminata, Don. (Eng. 1765.)
L. axillaris, Don. (Eng. 1765.)
L. Catesbæi, Gray.* (Eng.)
L. Davisiæ, Torr. (Eng. 1853.)
L. racemosa, Gray. * (Eng.)
L. recurva, Buckl. Kelsey 1889. (Eng.)
Menziesia. 7 species; 3 in our region.
M. ferruginea, Smith. Gill. 1881. (Eng. 1811.)
M. globularis, Salisb. Kelsey '89-'90. (Eng. 1806.)
Oxydendrum. Species single.
O. arboreum, DC. * (Eng. 1752.)
Pyrola. Species 14; 8 in our region.
P. elliptica, Nutt. Gill. 1881. (Eng. 1818.)
P. picta, Smith. Gill. 1881.
P. rotundifolia, Linn. Gill. 1881.
P. rotundifolia, var. uliginosa, Gray. G. & H. 1891.
P. secunda, Linn. Gill. 1881.
Rhododendron. Species about 130; 16 in our region.
R. albiflorum, Hook. (Eng.)
R. arborescens, Torr. (Azalea arborescens.) * (Eng. 1818.)
R. calendulaceum, Torr. (Azalea calendulacea.) * (Eng. 1806.)
R. Californicum, Hook. * (Eng.)
R. Catawbiense, Michx. * (Eng. 1809.) "Largely hybridized with other species, and varied in cultivation."—Gray.
R. maximum, Linn.* (Eng. 1756.)
R. nudiflorum, Torr. (Azalea nudiflora.) * (Eng. 1734.) "Many hybrid forms are in cultivation."—Gray. Azalea speciosa, of Dict. Gard., if American at all, is probably Rhododendron nudiflorum.
R. punctatum, Andr. * (Eng. 1786.)
R. Rhodora, Don. * (Rhodora Canadensis.) (Eng.)
R. Vaseyi, Gray. Kelsey 1885.
R. viscosum, Torr. (Azalea viscosa.) * (Eng. 1734.) Many varieties.
R. viscosum var. glaucum, Gray. (Azalea hispida.)* (Eng. 1734.)
R. viscosum var. nitidum, Gray. (Azalea nitida.)* (Eng. 1812.)
Vaccinium. About 100 species; 25 grow in our region.
V. arboreum, Marsh. Gill. 1881.
V. Canadense, Kalm. G. & H. 1891.
V. corymbosum, Linn. *
V. corymbosum, Linn., var. atrococcum, Gray. G. & H. 1891.
V. erythrocarpon, Michx. Kelsey '90-'91.
V. hirsutum, Buckl. Kelsey '90-'91.
V. macrocarpon, Ait. * (Eng. 1760.) The common cranberry; began to be cultivated in this country about 1800.
V. ovalifolium, Smith. Gill. 1881.
V. Oxycoccus, Linn. G. &. H. 1891.)
V. parvifolium, Smith. Gill. 1881.
V. Pennsylvanicum, Lam. *
V. stamineum, Linn. *
V. vacillans, Solander. *
V. Vitis-Idæa, Linn. *
DIAPENSIACEÆ, DIAPENSIA FAMILY.
Galax. Species single.
G. aphylla, Linn. *

Pyxidanthera. Species single.
P. barbulata, Michx. Gill. 1881. (Eng. 1851.)
Shortia. Species two; 1 in America, 1 in Japan.
S. galacifolia, Torr. & Gray. Kelsey 1888.

Plumbaginaceæ, Leadwort Family.

Plumbago. About 10 species; 1 in our region.
P. scandens, Linn. * (Eng. 1699.)

Primulaceæ, Primrose Family.

Dodecatheon. We have 8 species.
D. Clevelandi, Greene. (1890, Henderson, Farquhar.) Orcutt, 1891, catalogues two varieties: "Alba. Divisions of a pure white." "Splendens. Divisions of a deep brilliant phlox-purple."
D. frigidum, Cham. & Schlecht. (Eng. 1869.)
D. Jeffreyi, Moore. (D. Media var. lancifolium.) * (Eng. 1867.)
D. Meadia, Linn. * (Eng. 1744.)
D. Meadia var. brevifolium, Gray. (D. integrifolium.) * (Eng. 1829.)
Douglasia. Species four.
D. nivalis, Lindl. (Eng. 1827.)
Lysimachia. We have 5 species. (See also Steironema.)
L. quadrifolia, Linn. Gill. 1881.
L. stricta, Ait. Gill. 1881.
L. thyrsiflora, Linn. *
Primula. Species about 80; a dozen in our region.
P. Cusickiana, Gray. Hors. 1889 (1886).
P. farinosa, Linn. *
P. Mistassinica, Michx. Gill. 1884. (Eng. 1818.)
P. Parryi, Gray. (Eng. 1865.)
P. Rusbyi, Greene. Hors. 1889 (1886). (Eng. 1881.)
P. suffrutescens, Gray. (Eng. 1884.)
Steironema. Four species in our region.
S. (Lysimachia) ciliatum, Raf. (Eng. 1869.)
S. (Lysimachia) lanceolatum, Gray. (Eng.)
S. (Lysimachia) longifolium, Gray. Gill. 1881.
Trientalis. Species two.
T. Americana, Pursh. Gill. 1881. (Eng. 1816.)
T. Europæa, Linn, var. arctica, Leb. Gill. 1881.
T. Europæa var. latifolia, Torr. Gill. 1881.

Myrsinaceæ.

Ardisia. One in our region; 200 in all.
A. Pickeringia, Torr & Gray. *
Jacquinia. A half dozen species; 2 in our region.
J. armillaris, Linn. * (Eng. 1768.)
Myrsine. One in this country; 80 in all.
M. Rapanea, Roem. & Schult. (M. Floridana.) Reasoner.

Sapotaceæ, Sapodilla Family.

Bumelia. Some 20 species; 5 in our region.
B. lanuginosa, Pers. *
Chrysophyllum. A tropical genus of 60 species; 1 in our region.
C. oliviforme, Lam. Reasoner.
Mimusops. 30 species; 1 in south Florida.
M. Sieberi, A. DC. Reasoner.

Ebenaceæ, Ebony Family.

Diospyros. Over 150 species; 2 in our region.
D. Virginiana, Linn. * (Eng. 1629.)

Styracaceæ, Storax Family.

Halesia. A half dozen species; 3 in our region.
H. diptera, Linn. * (Eng. 1758.)
H. parviflora, Michx. (Eng. 1802.)
H. tetraptera, Linn. * (Eng. 1756.)
Styrax. About 60 species, of which we have 5.
S. Americana, Lam. *(Eng.)
S. Californica, Torr. (Eng.)
S. grandifolia, Aiton. * (Eng. 1765.)
S. pulverulenta, Michx. (Eng. 1794.)
Symplocos. About 150 species: 1 native to our region.
S. tinctoria, L'Her. (Eng. 1780.)

Oleaceæ, Olive and Ash Family.

Chionanthus. Species 3; 1 in our limits.

- C. Virginica, Linn. * (Eng. 1796.)
- Fraxinus. About 30 species; 12 in our territory.
  - F. Americana, Linn. * (Eng. 1723.) Varieties aucubæfolia and juglandifolia and others are catalogued.
  - F. dipetala, Hook. & Arn. Orcutt, 1891.
  - F. Oregana, Nutt. *
  - F. platycarpa, Michx. * (Eng. 1724.)
  - F. pubescens, Lam. (Eng. 1811.)
  - F. quadrangulata, Michx. * (Eng. 1823.)
  - F. sambucifolia, Lam. * (Eng. 1800.)
  - F. viridis, Michx. f.* (Eng. 1824.)
- Osmanthus. Seven species; 1 in our limits.
  - O. (Olea) Americana, Benth. & Hook. * (Eng. 1758.)

APOCYNACEÆ, DOGBANE FAMILY.

- Amsonia. Eight or ten species; 4 North American, some Japanese.
  - A. angustifolia, Michx. (A. ciliata.) Kelsey, 1891.
  - A. angustifolia, Michx., var. Texana, Gray. Wool. 1883.
  - A. Tabernæmontana, Walter. * (Eng. 1759.)
- Apocynum. Species 5; 2 American.
  - A. androsæmifolium, Linn. Gill. 1881.
- Echites. Four in this country; 35 in all.
  - E. Andrewsii, Chapm. *
  - E. paludosa, Vahl. *
  - E. umbellata, Jacq. Reasoner. (Eng. 1733.)
- Vinca. Species 10; 1 in our region.
  - V. rosea, Linn. * (Eng. 1758.) Generally cultivated.

ASCLEPIADACEÆ, MILKWEED FAMILY.

- Asclepias. Species 60; 48 within our territory.
  - A. amplexicaulis, Michx. Gill. 1881.
  - A. Cornuti, Decaisne. (A. Syriaca.) * (Eng. 1629.)
  - A. Curassavica, Linn. * (Eng. 1692.)
  - A. eriocarpa, Benth. Gill. 1881.
  - A. incarnata, Linn. * (Eng. 1710.)
  - A. incarnata, var. pulchra, Pers. *
  - A. Mexicana, Cav. (A. fascicularis, Dec.) Gill. 1881.
  - A. phytolaccoides, Pursh. Kelsey, '90-'91. (Eng. 1812.)
  - A. purpurascens, Linn. (Eng. 1732.)
  - A. quadrifolia, Linn. Gill. 1884. (Eng. 1820.)
  - A. rubra, Linn. (Eng. 1825; 1826 as A. acuminata.)
  - A. speciosa, Torr. (A. Douglasii.) Gill. 1881. (Eng. 1846.)
  - A. tuberosa, Linn. * (Eng. 1690.)
  - A. variegata, Linn. Wool. 1883. (Eng. 1597.)
  - A. verticillata, Linn. Wool. 1883. (Eng. 1759.)
- Asclepiodora. Two species.
  - A. (Anantherix) viridis, Gray. (Eng. 1812.)
- Gonolobus. About 70 species; 15 in this territory.
  - G. Carolinensis, R. Br. (Eng. 1824.)
  - G. lævis, Michx. (Eng. 1806.)
  - G. obliquus, R. Br. (Eng. 1809.)
  - G. suberosus, R. Br. (Eng. 1732.)
- Podostigma. One species.
  - P. pubescens, Ell. Gill. 1881. (Eng. 1824.)

LOGANIACEÆ, LOGANIA FAMILY.

- Gelsemium. Species 3; 1 in this region.
  - G. sempervirens, Ait. * (Eng. 1840.)
- Spigelia. Species about 30; we have 5.
  - S. Marilandica, Linn. (Eng 1694.)

GENTIANACEÆ, GENTIAN FAMILY.

- Erythræa. 30 species; 10 in our limits.
  - E. Muhlenbergii, Griseb. (Eng.)
  - E. venusta, Gray. Orcutt 1891. (Eng. 1878.)
- Eustoma. Species 3 or 4; 2 in our territory.
  - E. Russellianum, Griseb. (Lisianthus Russellianus.) (Eng. 1804.)
  - E. silenifolium, Sabisb. (E. exaltatum.) (Eng. 1804.)

Frasera. Nine species, American.
F. Carolinensis, Walt. (F. Walteri.) (Eng. 1795.)
F. Cusickii, Gray. Hors. 1889.
F. Parryi, Torr. Orcutt 1891.
Gentiana. About 180 species; 42 in our limits.
G. affinis, Griseb. (Eng.)
G. alba, Muhl. *
G. Andrewsii, Griseb. * (Eng. 1776.)
G. angustifolia, Michx. Gill. 1881.
G. calycosa, Griseb. *
G. crinita, Froel. * (Eng. 1804.)
G. linearis, Froel. Gill. 1881. (Eng.)
G. Newberryi, Gray. Gill. 1881.
G. ochroleuca, Froel. (Eng. 1820.)
G. Oregana, Engelm. (G. affinis var. ovata.) Hors. 1889 (1884).
G. puberula, Michx. G. & H. 1891. Wool. about 1889.
G. quinqueflora, Lam. Gill. 1881. (Eng. 1834.)
G. Saponaria, Linn. Gill. 1881.
G. sceptrum, Griseb. Hors. 1889 (1884).
Limnanthemum. About 24 species; 2 in our region.
L. lacunosum, Griseb. Gill. 1881.
L. trachyspermum, Gray.*
Menyanthes. Three species; 2 American.
M. Crista-galli, Menzies. (Eng.)
M. trifoliata, Linn. *
Sabbatia. About 20 species; 14 in our region.
S. angularis, Pursh. (Eng. 1826.)
S. calycosa, Pursh. (Eng. 1812.)
S. campestris, Nutt. (Eng. 1855.)
S. chloroides, Pursh. Gill. 1881. (Eng. 1817.)
S. lanceolata, T. & G. Gill. 1881.
S. paniculata, Pursh. (Eng. 1817.)
S. stellaris, Pursh. (Eng. 1827.)
Swertia. About 40 species; 1 here.
S. perennis, Linn. Hors. 1889.

Polemoniaceæ, Phlox Family.

Gilia. An American genus; 102 species coming within our range.
G. achilleæfolia, Benth. * (Eng. 1833.) A white variety is offered.
G. androsacea, Steud. (Leptosiphon androsaceus.) * (Eng.)
G. Brandegei, Gray. (Eng. 1878.)
G. capitata, Dougl. * (Eng. 1826.) There is a white-flowered variety; also var. major.
G. congesta, Hooker. Hors. 1889.
G. coronopifolia, Pers. (Ipomopsis elegans.) * (Eng.) Common in gardens.
G. debilis, Watson. Hors. 1889.
G. densiflora, Benth. (Leptosiphon densiflorus.) * (Eng.)
G. dianthoides, Endl. (Fenzlia dianthiflora, and F. speciosa.)* (Eng. 1855.) There is a white variety.
G. (Collomia) grandiflora, Gray. Orcutt, 1891. (Eng. 1826.)
G. (Collomia) heterophylla, Dougl. (Eng. 1828.)
G. inconspicua, Dougl. (Eng.)
G. (Collomia) linearis, Gray. (Eng. 1828.)
G. liniflora, Benth. * (Eng. 1833.)
G. micrantha, Steud. (Eng. 1870.)
G. minima, Gray. Orcutt, 1891. ("C. minima cærulea.")
G. tricolor, Benth. * (Eng. 1833.) Several garden varieties.
Lœselia. About 3 in our region 7; or 8 in all.
L. effusa, Gray. Orcutt, 1891.
L. tenuifolia, Gray. Orcutt, 1891. Both the above grow in Lower California, but have been found near the international boundary.
Phlox. About 30 species; 28 in our region.
P. amœna, Sims. * (Eng. 1809.)
P. "Californica." Gill. 1881.
P. divaricata, Linn. (P. Canadensis.) * (Eng. 1746.)
P. Douglasii, Hook. Gill. 1881.
P. Drummondii, Hook. * (Eng. 1835.) Very familiar in gardens and running into numerous varieties.
P. glaberrima, Linn. *
P. maculata, Linn. (Eng. 1840.) Long cultivated in this country, probably coming from European dealers. Gillett & Horsford offer it for 1891.

P. ovata, Linn. * (Eng. 1759.)
P. paniculata. Linn. (P. decussata.) * (Eng. 1752.) Long known in gardens.
P. pilosa, Linn. Wool. 1883. (Eng. 1759.)
P. procumbens, Lehm. (Eng. 1827.) "Unknown as a wild plant, and is apparently a hybrid between P. subulata and P. amœna."—Gray.
P. reptans, Michx. Gill. 1881.
P. speciosa, Pursh. Gill. 1881.
P. Stellaria, Gray. *
P. subulata, Linn. * (Eng. 1786.)
P. subulata, var. nivalis. Wool. 1883.
Polemonium. We have 11 species.
P. cæruleum, Linn. * Probably grown from European stock where it is also native. A white variety is offered.
P. confertum, Gray. (Eng. 1886.)
P. flavum, Greene. (Eng.)
P. humile, Willd. (P. Richardsonii). * (Eng. 1727.)
P. reptans, Linn. * (Eng. 1758.)

HYDROPHYLLACEÆ, WATERLEAF FAMILY.

Hesperochiron. Two species.
H. Californicus, Watson. Gill. 1881.
H. pumilis, Porter. Gill. 1881.
Hydrolea. Species 4, out of 14 in the world.
H. Caroliniana, Michx. (Eng. 1824.)
H. corymbosa, Ell. (Eng.)
Hydrophyllum. Half dozen American species.
H. appendiculatum, Michx. * (Eng. 1812.)
H. Canadense, Linn. Gill. 1881. (Eng. 1759.)
H. capitatum, Dougl. Gill. 1881.
H. Virginianum, Linn. Gill. 1881. (Eng. 1739.)
Nama. In this country there are 16 species.
N. Parryi, Gray. (Eng. 1881.)
Nemophila. 9 species, American.
N. aurita, Lindl. Orcutt, 1891. (Eng. 1831.) There is a white variety.
N. insignis, Dougl. * (Eng. 1822.)
N. maculata, Benth. * (Eng. 1848.)
N. Menziesii, Hook. & Arn. (N. atomaria, N. discoidalis). * (Eng. 1836.)
N. phacelioides, Nutt. (Eng. 1822.)
Phacelia. Nearly 100 species; 76 in our region.
P. campanularia, Gray. Orcutt, 1891. (Eng. 1882.)
P. congesta, Hook. * (Eng. 1835.)
P. divaricata, Gray, var. Wrangeliana, A. DC. (Eutoca Wrangeliana.) * (Eng. 1833.)
P. Franklinii, Gray. (Eng. 1827.)
P. grandiflora, Gray. (Eng.)
P. Menziesii. Torr. * (Eutoca multiflora.) (Eng. 1826.)
P. Parryi, Torr. Orcutt, 1891. (Eng.)
P. sericea, Gray. (Eng. 1827.)
P. tanacetifolia, Benth. Orcutt, 1891. (Eng. 1832.) Also a white variety.
P. viscida, Torr. * (Eutoca viscida.) (Eng. 1834.)
P. Whitlavia. Gray. (Whitlavia grandiflora.) * (Eng. 1854.)
Ramanzoffia. Two species.
R. Sitchensis, Bong. (Eng. 1873.)

BORRAGINACEÆ, BORAGE FAMILY.

Cordia. Four in our region; 200 in all.
C. Sebestena, Linn. Reasoner. (Eng. 1728.)
Cynoglossum. Sixty species; we have 4.
C. grande, Dougl. Gill. 1881.
C. Virginicum, Linn. (Eng.)
Echinospermum. About 50; 12 in our region.
E. diffusum, Lehm. (Eng.)
E. Virginicum, Lehm. (Eng.)
Heliotropium. About 150 species; 11 in our region.
H. convolvulaceum, Gray. (Eng. 1867.)
Krynitzkia. In our region there are 66 species. (Including species formerly referred to Eritrichium.)
K. (Eritrichium) barbigera, Gray. (Eng. 1886.)
K. glomerata, Gray. Gill. 1881.
Lithospermum. About 40 species; a dozen in our region.

L. canescens, Lehm. Gill. 1881. (Eng. 1826.)
L. hirtum, Lehm. Gill. 1881. (Eng. 1812.)
L. pilosum, Nutt. Gill. 1881.
Mertensia. Fifteen species; 7 in our limits.
M. alpina, Don. (Eng. 1875.)
M. lanceolata, DC. (Eng. 1874.)
M. oblongifolia, Don. Gill. 1881.
M. paniculata, Don. Wool. 1883. (Eng.)
M. Sibirica, Don. Gill. 1881. (Eng. 1801.)
M. Virginica, DC. * (Eng. 1799.)
Onosmodium. A half dozen species; 4 in our region.
O. Carolinianum, DC. (Eng. 1759.)
O. Virginianum, DC. (Eng. 1812.)

CONVOLVULACEÆ, MORNING-GLORY FAMILY.

Breweria. About 20 species; 5 in our limits.
B. grandiflora, Gray. Reasoner.
Convolvulus. About 150 species have been described; 13 in our region.
C. occidentalis, Gray. Gill. 1881.
C. (Calystegia) sepium, Linn. Occurs occasionally in old gardens, sometimes double; the cultivated plant probably introduced from the Old World, where it is also native.
C. sepium var. Americanus, Sims. (Eng.) "There is a variety named incarnata, with rose-colored flowers, North America." Dict. Gard.
Ipomœa. About 400 species are described; 31 grow in our region.
I. Bona-nox, Linn.*
I. coccinea, Linn. * Introduced to cultivation from outside our area, probably.
I. hederacea, Jacq. *
I. Jalapa, Pursh. (I. Michauxii.)* (Eng. 1733.)
I. Mexicana, Gray. * The cultivated I. Mexicana may not be the one known to botanists by that name.
I. pandurata, Meyer. * (Eng. 1776.) Now coming into common cultivation.
I. Pes-capræ, Sweet. *
I. sinuata, Ortega. (I. quercifolia of dealers.) (Eng. 1813.)
Jacquemontia. Three species in our region; nearly 40 in all.
J. violacea, Choisy. (Eng. 1808.)

SOLANACEÆ, NIGHTSHADE FAMILY.

Capsicum. A single species native to our region; over 50 species have been described.
C. baccatum, Linn.* (Eng. 1731.)
Datura. A genus of 12 species; of which only 1 is native in our region.
D. meteloides, DC. (D. Wrightii.)* (Eng. 1856.)
Physalis. 17 species in our region; some 30 or 40 have been described.
P. pubescens, Linn. * (Eng.)
Solanum. A vast genus, of some 900 species; 16 native to our region.
S. Jamesii, Torrey. This was introduced about 12 years ago.
S. nigrum, Linn. * Native also to Europe whence it has come into cultivation as the morelle of the French.
S. Texanum, Dunal, is S. integrifolium of Poiret, and is not American. See Bull. 26, Cornell Exp. Sta. p. 25.
S. Torreyi, Gray. (Eng. 1878.)

SCROPHULARIACEÆ, FIGWORT FAMILY.

Antirrhinum. 17 species, out of 25 or 30, occur in our region.
A. maurandioides, Gray. (Maurandia antirrhiniflora.) *
A. Orcuttianum, Gray. Orcutt 1891.
"Browallia Roezli, Rocky Mt." Dict. Gard.
Castilleia. Twenty-eight species, all American.
C. affinis, Hook, & Arn. Orcutt 1891.
C. coccinea, Spreng. (Eng. 1787.)
C. foliolosa, Hook & Arn. Orcutt 1891.
C. indivisa, Engelm. * (Eng. 1878.)
C. miniata, Dougl. (Eng. 1874.)
Chelone. Four species; American.
C. glabra, Linn. *
C. glabra var. alba. Kelsey '91-'92.

- C. Lyoni, Pursh. * (Eng. 1872.)
- C. nemorosa, Dougl. * (Eng. 1827.)
- C. obliqua, Linn. * (Eng. 1752.) A variety alba is in cultivation.

Collinsia. American; 17 species.
- C. bartisiæfolia, Benth.* var. alba. Orcutt 1891.
- C. bicolor, Benth. * (Eng. 1833.) There are 5 or 6 cultivated varieties, varying mostly in color of flowers.
- C. grandiflora, Dougl. *
- C. parviflora, Dougl. (Eng. 1826.)
- C. sparsiflora, Fisch. & Mey. (Eng. 1836.)
- C. tinctoria, Hartweg. (Eng. 1848.)
- C. verna, Nutt. * (Eng. 1855.)
- C. violacea, Nutt. (Eng. 1871.)

Gerardia. About 30 species; we have 23.
- G. lævigata, Raf. (G. integrifolia, Gray.) Gill. 1881.
- G. pedicularia, Linn. Gill. 1881. (Eng.)
- G. purpurea, Linn. (Eng. 1772.)
- G. quercifolia, Pursh. Gill. 1881.

Gratiola. There are 20 species; 13 are in our region.
- G. aurea, Muhl. * (Eng. 1828.)
- G. pilosa, Michx. (Eng. 1827.)
- G. ramosa, Walt. (Eng. 1821.)
- G. Virginiana, Linn. (Eng. 1759.)

Herpestis. About 50 species; of which we have 6.
- H. Monniera, HBK. (Eng.)

Linaria. About 130 species; 2 are in our territory.
- L. Canadensis, Dumont. (Eng. 1812.)

Mimulus. Nearly 70 species; 57 are native within our limits.
- M. alatus, Ait. Gill. 1881.
- M. Californica. Gill. 1881.
- M. cardinalis, Dougl. *
- M. Fremonti, Gray. (Eng. 1882.)
- M. glutinosus, Wendl. Gill. 1881. (Eng.)
- M. Lewisii, Pursh. Gill. 1881. (Eng. 1831.)
- M. luteus, Linn. Hors. 1889.
- M. luteus var. alpinus, Gray. (M. Roezlii.) *
- M. Mohavensis, Lemmon. (Eng. 1885.)
- M. moschatus, Dougl. * (Eng. 1826.)
- M. primuloides, Benth. (Eng.)
- M. puniceus, Steud. (Eng.)
- M. ringens, Linn. Gill. 1881.

Orthocarpus. We have 25 species.
- O. erianthus Benth., var. roseus. Gray. (Triphysaria versicolor.) (Eng. 1837.)
- O. purpurascens, Benth. Orcutt 1891.

Pedicularis. About 120 species; 31 in our territory.
- P. Canadensis, Linn. Gill. 1881. (Eng. 1780.)
- P. racemosa, Dougl. Gill. 1881.

Pentstemon. An American genus; 86 being in our region.
- P. acuminatus, Dougl. (Eng. 1827.)
- P. antirrhinoides, Benth. (Eng. 1824.)
- P. attenuatus, Dougl. (Eng. 1827.)
- P. azureus, Benth. Gill. 1881. (Eng. 1858.)
- P. azureus var. Jaffrayanus, Gray, (Eng. 1858.)
- P. baccharifolius, Hook. (Eng. 1848.)
- P. barbatus, Nutt. * (Eng. 1794.)
- P. barbatus var. Torreyi, Gray. (P. Torreyi.) * (Eng.)
- P. breviflorus, Lindl. (Eng.)
- P. centranthifolius, Benth. Gill. 1881. (Eng. 1858.)
- P. Clevelandi, Gray. *
- P. Cobæa, Nutt. * (Eng. 1835.)
- P. confertus, Dougl. * (Eng. 1827.)
- P. confertus. Dougl., var. cæruleo-purpureus, Gray. Wool. 1883. (Eng.)
- P. cordifolius, Benth. Gill. 1881. (Eng. 1848.)
- P. deustus, Dougl. Gill. 1881. (Eng. 1827.)
- P. diffusus, Dougl. * (Eng. 1826.)
- P. Eatoni, Gray. (Eng. 1883.)
- P. glaber, Pursh. (P. speciosus.) * (Eng. 1811.)
- P. glandulosus, Lindl. Gill. 1881. (Eng. 1827.)
- P. glaucus, Graham. (Eng. 1827.)
- P. gracilentus, Gray. Gill. 1881.
- P. gracilis, Nutt. * (Eng. 1824.)
- P. grandiflorus, Nutt. Wool. 1883. (Eng. 1811.)
- P. heterophyllus, Lindl. (Eng. 1834.)

P. humilis, Nutt. (Eng. 1874.)
P. labrosus, Hook. f. (Eng. 1884.)
P. lætus, Gray. Gill. 1881.
P. lævigatus, Solander. (Eng.)
P. lævigatus var. Digitalis, Gray. * (Eng. 1824.)
P. Lemmoni, Gray. Gill. 1881.
P. Menziesii, Hook. Gill. 1881.
P. Menziesii var. Douglasii, Gray. (Eng.)
P. Menziesii, var. Newberryi, Gray. Gill. 1881.
P. Menziesii var. Scouleri, Gray. (Eng. 1827.)
P. Murrayanus, Hook. (Eng. 1835.)
P. ovatus. Dougl. * (Eng. 1836.)
P. Palmeri, Gray. * (Eng. 1873.)
P. pubescens, Solander. * (Eng. 1834.)
P. puniceus, Gray. Gill. 1881.
P. Richardsonii, Dougl. Gill. 1881. (Eng. 1825.)
P. secundiflorus, Benth. *
P. spectabilis, Thurb. * (Eng. 1816.)
P. tubiflorus, Nutt. *
P. triphyllus, Dougl. (Eng. 1827.)
P. venustus, Dougl. Gill. 1881. (Eng. 1827.)
P. Wrightii, Hook. (Eng. 1850.)
Scrophularia. Three specles in our limits; 120 in all.
S. nodosa, Linn., var. Marilandica, Gray. Occasionally grown as a bee-plant.
Seymeria. Nine species; 6 in our region.
S. pectinata, Pursh. (Eng. 1820.)
S. tenuifolia, Pursh. (Eng. 1730.)
Synthyris. We have 7 species.
S. reniformis, Benth. * (Eng. 1885.)
S. rotundifolia, Gray. Gill. 1881.
Veronica. Some 200 species; 11 in our region.
V. alpina, Linn. Wool. 1883.
V. Americana, Schwein. Gill. 1881.
V. Cusickii, Gray. Hors. 1889.
V. officinalis, Linn. Gill. 1884.
V. serpyllifolia, Linn. Kelsey '91-'92.
V. Virginica, Linn.* (Eng. 1714.)

LENTIBULARIACEÆ, BLADDERWORT FAMILY.

Pinguicula. About 30 species; 6 in our region.
P. lutea, Walt. (Eng. 1815.)
Utricularia. 150; 17 in our limits.
U. vulgaris, Linn. Gill. 1884.

BIGNONIACEÆ, BIGNONIA OR CATALPA FAMILY.

Bignonia. About 150 species have been described; we have 1.
B. capreolata, Linn. * (Eng. 1710.)
Catalpa. A half dozen species, of which we have 2.
C. bignonioides, Walt. (C. syringæfolia of nurserymen.) * (Eng. 1726.) There is a golden-leaved and a dwarf variety.
C. speciosa, Warder* (Eng. 1879.)
Chilopsis. Single species in Western America.
C. saligne, Don. (C. linearis). Orcutt 1891. (Eng. 1825.)
Tecoma. Two dozen species; 2 in our region.
T. radicans, Juss. * (Eng. 1640.) A variety atrosanguinea is catalogued.
T. stans, Juss. * (Eng. 1730.)

PEDALINACEÆ.

Martynia. 3 species in our region; 10 in all.
M. fragrans, Lindl. *
M. proboscidea, Glox. *

ACANTHACEÆ, ACANTHUS FAMILY.

Calophanes. Species about 26; 5 in our region.
C. oblongifolia, Don. (Eng. 1832.)
Dianthera. Spesies 80; 5 North American.
D. Americana, Linn. (Eng.)
Ruellia. 7 species in our region; 150 in the world.
R. ciliosa, Pursh. *

VERBENACEÆ, VERBENA FAMILY.

Callicarpa. 30 species; 1 here.
C. Americana, Linn. * (Eng. 1724.)
Duranta. One in our region; 4 or 5 others.
D. Pulmieri, Jacq.* (Eng. 1739.)
Lantana. About 50 species; 4 in our territory.
L. Camara, Linn. (Eng. 1692.)
Lippia. About 90 species described; 7 here.
L. nodiflora, Michx. (Eng.)
Phryma. Single species.
P. Leptostachya, Linn. (Eng. 1802.)

- Stachytarpheta. About 40 species; only one in this region.
    - R. Jamaicensis, Vahl. (Eng. 1714.)
- Verbena. Some 80 species; we have 15.
    - V. Aubletia, Linn. (Eng. 1774.)
    - V. bracteosa, Michx. (Eng. 1820.)
    - V. hastata, Linn. (Eng. 1810.)
    - V. stricta, Vent. (Eng.)
    - V. xutha, Lehm. (Eng. 1824.)

LABIATÆ, MINT FAMILY.

- Acanthomintha. Two species, American.
    - A. ilicifolia, Gray. Orcutt 1891. (Eng. 1883.)
- Blephilia. 2 species. American.
    - B. ciliata, Raf. (Eng. 1798.)
    - B. hirsuta, Benth. (Eng. 1798.)
- Brunella. Two or 3 species, of which we have one.
    - B. vulgaris, Linn. Kelsey '91-'92.
- Cedronella. We have 5; about 6 in all.
    - C. cana, Hook. *
    - C. cordata, Benth. (Eng. 1880.)
    - C. Mexicana, Benth. (Gardoquia Betonicoides.) *
- Collinsonia. Species 6; 4 in our territory.
    - C. anisata, Sims. (Eng. 1866.)
    - C. Canadensis, Linn. Gill. 1881. (Eng. 1734.)
- Cunila. Species 12; 1 in our region.
    - C. Mariana, Linn. * (Eng.)
- Lophanthus. We have 4 of the 6 species.
    - L. anisatus, Benth. * (Eng. 1826.)
    - L. nepetoides, Benth. (Eng. 1692.)
    - L. scrophulariæfolius, Benth. (Eng. 1800.)
    - L. urticifolius, Benth. (Eng. 1826.)
- Micromeria. 60 species; 3 here.
    - M. Douglasii. Benth. Gill. 1881.
- Monarda. Nine species in our region.
    - M. Bradburiana, Beck. (Eng. 1850.)
    - M. clinopodioides, Gray. (Eng.)
    - M. didyma, Linn.* (Eng. 1656.) There is a variety alba in cultivation.
    - M. fistulosa, Linn. * (Eng. 1656.)
    - M. f. var. mollis, Benth.* (Eng.)
    - M. Russelliana, Nutt. (Eng. 1823.)
- Monardella. Fourteen species, all American.
    - M. candicans, Benth. (Eng. 1853.)
    - M. lanceolata, Gray. Orcutt 1891.
    - M. macrantha, Gray. Gill. 1881. (Eng. 1877.)
    - M. macrantha, var. nana, Gray. (M. nana.) Orcutt 1891.
    - M. odoratissima, Benth. Gill. 1881.
- Ocimum. About 40; 1 here.
    - O. micranthum, Willd. (Eng. 1825.)
- Physostegia. Three species, American.
    - P. intermedia, Gray. (Eng.)
    - P. parviflora, Nutt. (Eng. 1826.)
    - P. Virginiana, Benth. * (Eng. 1683.)
    - P. Virginiana, var. denticulata, Gray. (Eng.)
    - P. Virginiana, var. speciosa, Gray. (Eng.)
- Pogogyne. Calfornian, 5.
    - P. Douglasii, Benth. (Eng. 1871.)
    - P. nudiuscula, Gray. (Eng. 1886.)
- Salvia. 29 in our region; 450 in the world.
    - S. azurea, Lam. (Eng. 1806.)
    - S. carduacea, Benth. Orcutt 1891. (Eng. 1854.)
    - S. coccinea, Linn. *
    - S. Columbariæ, Benth. Orcutt 1891. (Eng.)
    - S. farinacea, Benth. (Eng. 1847.)
    - S. Greggii, Gray. Wool. 1883.
    - S. Rœmeriana, Scheele.* (Eng. 1852.)
- Scutellaria. About 90 species; we have 23.
    - S. angustifolia, Pursh. Gill. 1881.
    - S. antirrhinoides, Benth. Gill. 1881.
    - S. brevifolia, Gray. Wool. 1883.
    - S. galericulata, Linn. Gill. 1881.
    - S. lateriflora, Linn. Gill. 1881.
    - S. parvula, Michx. (Eng. 1822.)
    - S. serrata, Andr. (Eng. 1800.)
    - S. Wrightii, Gray. Gill. 1881.
- Stachys. About 200 species have been described; 16 in this region.
    - S. aspera, Michx. Kelsey '91-'92.
- Synandra. Species 1, American.
    - S. grandiflora, Nutt. (Eng. 1827.)

Trichostema. Species 9, all American.
- T. lanatum, Benth., var. denudatum, Gray. (T. Parishii.) (Eng.)

NYCTAGINACEÆ, FOUR-O'CLOCK FAMILY.

Abronia. Species 13; all North American.
- A. fragrans, Nutt. (Eng. 1865.)
- A. latifolia, Esch. * (A. arenaria.) (Eng. 1865.)
- A. mellifera, Dougl. Gill. 1881.
- A. umbellata, Lam. * (Eng. 1823.)
- A. villosa, Wats. Orcutt 1891.

Mirabilis. Species 10; 7 in our limits.
- M. Californica, Gray. Gill. 1881.
- M. multiflora, Gray. Gill. 1881.

Oxybaphus. Ten species, out of 20, in our region.
- O. viscosus, L'Her. (Eng. 1793.)

Pisonia. Sixty species; 3 in our territory.
- P. aculeata, Linn. (Eng. 1806.)
- P. obtusata, Swz. (Eng. 1824.)

ILLICEBRACEÆ, KNOTWORT FAMILY.

Paronychia. Some 40 species; 13 in our region.
- P. dichotoma, Nutt. Wool. 1883.

AMARANTACEÆ, AMARANTH FAMILY.

Frœlichia. Species about 10; in North and South America.
- F. Floridana. Moq. (Eng.)

CHENOPODIACEÆ, PIGWEED FAMILY.

Chenopodium. Some 50 species; 13 are native to our region.
- C. (Blitum) capitatum, Wats. Introduced three or four years ago by Dr. T. H. Hoskins as Strawberry Spinage.

Cycloloma. A single species.
- C. platyphyllum, Moq. Introduced two or three years ago by John Lewis Childs as the Cyclone Plant.

PHYTOLACCACEÆ, POKEWEED FAMILY.

Petiveria. One species.
- P. alliacea, Linn. (Eng.)

Phytolacca. Ten species; we have one.
- P. decandra, Linn. * Sometimes cultivated for the asparagus-like shoots.

Rivina. Two species in our region.
- R. humilis, Linn. *

POLYGONACEÆ, BUCKWHEAT OR KNOTWEED FAMILY.

Coccoloba. Two species in our region; 80 in all.
- C. Floridana, Meisn. *

Eriogonum. About 130 species; in our region 122.
- E. compositum, Dougl. Gill 1881.
- E. heracleoides, Nutt. Gill. 1881.
- E. incanum, Torr & Gray. Gill. 1881.
- E. niveum, Dougl. Gill. 1881.
- E. nudum, Dougl. Gill. 1881.
- E. ovalifolium, Nutt. Hors. 1889.
- E. sphærocephalum, Dougl. Gill. 1881.
- E. stellatum, Benth. (Eng.)
- E. thymoides, Benth. Hors. 1889.

Polygonella. Seven species, American.
- P. parvifolia, Michx. Gill. 1881.

Rumex. About 130 species; a dozen here.
- R. occidentalis, Watson. Gill. 1881.
- R. venosus, Pursh. Gill. 1881.

ARISTOLOCHIACEÆ, BIRTHWORT FAMILY.

Aristolochia. About 100 species in warm countries; 8 species in United States.
- A. Californica, Torr. Gill. 1884.
- A. Serpentaria, Linn.*
- A. Sipho, L'Her. * (Eng. 1763.)
- A. tomentosa, Sims. * (Eng. 1799.)

Asarum. About 13 species; 6 in our limits.
- A. arifolium, Michx. Kelsey '89-'90.
- A. Canadense, Linn. Gill. 1881. (Eng. 1713.)
- A. caudatum, Lindl. Gill. 1881. (Eng. 1880.)
- A. Hartwegi, Watson. Gill. 1881.
- A. Lemmoni, Watson. Gill. 1881.
- A. Virginicum, Linn. Gill. 1881.

PIPERACEÆ, PEPPER FAMILY.

Houttunyia. Two or three species; 1 in California.
- H. Californica, Benth & Hook. (Eng.)

Saururus. Species 2; 1 Asian, 1 American.

S. cernuus, Linn. Gill. 1881. (Eng. 1759.)

LAURACEÆ, LAUREL FAMILY.

Lindera. About 50 species; 2 in our region.

L. Benzoin, Blume. (Eng. 1683.)

L. melissæfolia, Blume. (Eng. 1810.)

Litsea. About 140 species; we have one.

L. geniculata, Benth & Hook. (Eng. 1759.)

Persea. About 100 species; we have one.

P. Carolinensis, Nees. *

Sassafras. Single species.

S. officinale, Nees. * (Eng. 1633.)

Umbellularia. A single species, U. (Oreodaphne) Californica. Nutt. Orcutt 1891. (Eng. 1862.)

THYMELÆACEÆ, MEZEREUM FAMILY.

Dirca. Two species; North American.

D. palustris, Linn. *

ELÆAGNACEÆ, OLEASTER FAMILY.

Elæagnus. Some 20 species described: a single one in America.

E. argentea, Pursh.* (Eng. 1815.)

Shepherdia. Three species; North American.

S. argentea, Nutt. (Eng. 1820.) See pp. 50, 52 and 166.

S. Canadensis, Nutt. G. & H. 1891. (Eng. 1759.)

SANTALACEÆ, SANDALWOOD FAMILY.

Pyrularia. Species 2; 1 Asian, 1 North American.

P. pubera, Michx. (P. oleifera.) (Eng. 1800.)

EUPHORBIACEÆ, SPURGE FAMILY.

Drypetes. Two within these limits; 9 in the world.

D. crocea, Poit. (Eng. 1820.)

Euphorbia. Some 600 species; in our region there are 106.

E. corollata, Linn. Gill. 1881.

E. heterophylla, Linn. Goodell. 1889.

E. marginata, Pursh. *

E. Palmeri, Engelm. Gill. 1881.

Hippomane. One species.

H. Mancinella, Linn. (Eng. 1690.)

Jatropha. Eight species in North America; about 70 in the world.

J. multifida, Linn. (Eng. 1696.)

Pachysandra. Two species; 1 Japanese, 1 North American.

P. procumbens, Michx. * (Eng. 1800.)

Simmondsia. Single species.

S. Californica, Nutt. Orcutt 1891. (Eng.)

URTICACEÆ, NETTLE FAMILY.

Celtis. From 50 to 70 species; 5 in our region.

C. Mississippiensis, Bosc. (C. crassifolia.) (Eng. 1812.)

C. occidentalis, Linn. * (Eng. 1656.) There is a variety pumila in trade catalogues.

Ficus. A tropical genus of 600 species; 3 in our region.

F. aurea, Nutt. Reasoner.

Humulus. Two species; 1 in this country.

H. Lupulus, Linn. Native to both Europe and America. Long cultivated, but coming probably from Europe.

Maclura. Single species.

M. aurantiaca, Nutt. * (Eng. 1818.) Long grown as a hedge-plant. (Osage Orange.)

Morus. About a dozen species; 2 in our region.

M. rubra, Linn. * (Eng. 1629.) Mentioned by Downing as early as 1845 as an attractive tree under cultivation. An early record, apparently, of the cultivation of Morus rubra is given by the botanist, Frederick Pursh, in 1806 or 1807, in an entry in his journal for July 9, while he was in the vicinity of Cayuga Lake, N. Y. "Morus rubra frequent. On one or two farms I observed the mulberry cultivated in orchards, may be for the raising of silkworms, as the trees were low and planted in regular close rows." It is not certain whether Pursh meant to say that M. rubra was cultivated, or that the common garden mulberry occurred in the orchards.

Planera. Species two; North American.

P. aquatica, Gmel. * (Eng. 1816.)

Ulmus. About 16 species, of which we have 5.
  U. alata, Michx. (Eng. 1820.)
  U. Americana, Linn. * (Eng. 1752.) There is a weeping variety.
  U. fulva. Michx. * (Eng.) There is a weeping variety catalogued.
  U. racemosa, Thomas. *

PLATANACEÆ, PLANE-TREE FAMILY.

Platanus. A half dozen species; half in our region.
  P. occidentalis, Linn. * (Eng. 1636.)

JUGLANDACEÆ, WALNUT FAMILY.

Carya (or Hicoria). Nine or 10 species; American.
  C. alba, Nutt. (Hicoria ovata, Britton.) * (Eng.)
  C. amara, Nutt. (Hicoria minima, Britton.) * (Eng.)
  C. aquatica, Nutt. *
  C. microcarpa, Nutt. *
  C. olivæformis, Nutt. (Hicoria Pecan, Britton.) * (Eng. 1766.) Forty or fifty varieties of pecans are recognized. See Introduction List.
  C. porcina, Nutt. (Hicoria glabra, Britton.) * (Eng.)
  C. sulcata, Nutt. *
  C. tomentosa, Nutt. (Hicoria alba, Britton.) * (Eng. 1766.) Var. maxima, Nutt. "Var. maxima. Fruit-globose, nearly twice the size of that of the type; 'as large as an apple'; Husk exceedingly thick." Dict. Gard.

Juglans. Species 8; half in our region.
  J. cinerea, Linn. * (Eng. 1656.)
  J. nigra, Linn. * (Eng. 1656.)

MYRICACEÆ, SWEET-GALE FAMILY.

Myrica. Species about 35; 7 in our limits.
  M. (Comptonia) aspleniflora, Endl. * (Eng. 1714.)
  M. Californica, Cham. *
  M. cerifera, Linn. *
  M. Gale, Linn. *

CUPULIFERÆ, OAK FAMILY.

Alnus. Species 14; 6 in our territory.
  A. incana, Willd. *
  A. maritima, Muhl. *
  A. rubra, Bongard, (A. Oregana). *
  A. serrulata, Willd. *
  A. viridis, DC. Kelsey '90-'91. G. & H. 1891.

Betula. About 25 species; 8 in this region.
  B. glandulosa, Michx. (Eng. 1815.)
  B. lenta, Linn. * (Eng. 1759.)
  B. lutea, Michx. f. (B. excelsa.) *
  B. nigra, Linn. (B. rubra.) * (Eng. 1736.)
  B. papyrifera, Marsh. * (Eng. 1750.) Dict. Gard. gives the following varieties:
  var. fusca. Leaves smaller than those of the type, and less downy.
  var. platyphylla. Leaves very broad.
  var. trichoclada. Leaves cordate. Branches extremely hairy, and twigs in threes.
  B. populifolia, Ait. * (Eng. 1750.) Dict. Gard. records 2 varieties:
  var. laciniata. Leaves large, shining and deeply cut.
  var. pendula. Spray drooping like that of B. alba, var. pendula.
  B. pumila, Linn. (Eng. 1762.)

Carpinus. One species out of 9.
  C. Caroliniana, Walt. (C. Americana.) * (Eng. 1812.)

Castanea. Four or 5 species described; 2 in our region.
  C. pumila, Mill. * (Eng. 1699.)
  C. sativa, Mill., var. Americana, Watson. * Long cultivated; a few named varieties are disseminated.

Corylus. About 7; we have 2.
  C. Americana, Walt. * (Eng. 1798.)
  C. rostrata, Ait. * (Eng. 1745.)

Fagus. Some 15 species, of which we have 1.
  F. ferruginea, Ait. * (Eng. 1766.)

Ostrya. Two species; 1 in America.
  O. Virginica, Willd. * (Eng. 1692.)

Quercus. 300 species described; 53 in our region.
  Q. agrifolia, Nee. (Eng. 1849.)
  Q. alba, Linn. * (Eng. 1724.)
  Q. aquatica, Walt. * (Eng. 1723.)
  Q. bicolor, Willd. * (Eng. 1800.)

Q. Catesbæi, Michx. * (Eng. 1823.)
Q. cinerea, Michx.* (Eng. 1789.)
Q. coccinea, Wangh. * (Eng. 1691.)
Q. coccinea, var. tinctora, Gray.* (Eng. 1800.)
Q. densiflora, Hook. & Arn. (Eng. 1865.)
Q. falcata, Michx. (Eng. 1763.)
Q. heterophylla, Michx. *
Q. ilicifolia, Wangh. (Q. Banisteri.) * (Eng. 1800.)
Q. imbricaria, Michx. * (Eng.)
Q. lobata, Nee. *
Q. lyrata, Walt. * (Eng. 1786.)
Q. macrocarpa, Michx. * (Eng.)
Q. macrocarpa, var. olivæformis, Gray. *
Q. nigra, Linn. * (Eng. 1739.)
Q. palustris, Du Roi. * (Eng. 1800.) There is a variety compacta of this.
Q. Phellos, Linn. * (Eng 1723.)
Q. prinoides, Willd. *
Q. Prinus, Linn. * (Eng. 1730.) There is a cut-leaved variety.
Q. rubra, Linn. * (Eng. 1769.)
Q. stellata, Wangh. (Q. obtusiloba.) * (Eng. 1819.)
Q. undulata, Torr. *
Q. virens, Ait. * (Eng. 1737.)

SALICACEÆ, WILLOW FAMILY.
Populus. About 20 species; 8 in our region.
P. angustifolia, James. *
P. balsamifera, Linn. * (Eng. 1692.)
P. balsamifera var. suaveolens. Dict. Gard.
P. grandidentata, Michx.* (Eng. 1772.)
P. heterophylla, Linn. (Eng. 1765.)
P. monilifera, Ait. (P. Canadensis. P. Carolina.) * (Eng. 1738.) One or 2 horticultural varieties are catalogued.
P. temuloides, Michx. * (Eng.)
Salix. About 160 species; 63 in our territory.
S. candicans, offered by Temple & Beard in 1888-9 and said to come from Oregon, is probably not American; at all events there is no such American species.
S. candida, Willd. *
S. discolor, Muhl. *
S. lasiandra, Benth., var. lancifolia, Bebb. (Eng.)
S. longifolia, Muhl. *
S. lucida, Muhl. * (Eng.)
S. myrtilloides, Linn. *
S. nigra, Marsh. (Eng.)
S. tristis, Ait. *

EMPETRACEÆ, CROWBERRY FAMILY.
Ceratiola. Single species.
C. ericoides, Michx. Gill. 1881. (Eng. 1826.)
Corema. Two species; 1 in America.
C. Conradii, Torr. (Eng.)

CONIFERÆ, PINE OR CONE-BEARING FAMILY.
Abies. About 20 species; 9 in this country.
A. amabilis, Forbes. (Eng. 1831.)
A. balsamea, Mill.* (Eng. 1696.) A. Hudsonica is a dwarf northern form; it is in cultivation.
A. bracteata, Nutt. Orcutt 1891. (Eng. 1853.)
A. concolor, Lindley. * (A. lasiocarpa of nurseries.) (Eng. 1851.)
A. Fraseri, Lindley.* (Eng. 1811.)
A. grandis, Lindley.* (Eng. 1831.)
A. magnifica, Murray. Orcutt 1891. (Eng. 1851.)
A. nobilis, Lindley.* (Eng. 1831.)
A. subalpina, Engelm. * (Eng.)
Chamæcyparis. A half dozen species; 3 in our territory.
C. Lawsoniana, Parlat. * (Eng. 1853.) Several varieties are cultivated.
C. Nutkaensis, Spach. (Thuyopsis borealis.)* There is a variegated variety.
C. sphæroidea, Spach. * (Eng. 1736.) Referred often to thuja and cupressus.
Cupressus. A dozen species; 4 in our region.
C. Goveniana, Gordon. Orcutt 1891. (Eng. 1846.)
C. Guadalupensis, Wats. Orcutt 1891.
C. Macnabiana, Murray. Orcutt 1891. (Eng. 1853.)
C. macrocarpa, Hartweg. Orcutt 1891. (Eng. 1847.)

Juniperus. Twenty-five species; 7 in our region.
  J. Californica, Carr. * (Eng.)
  J. communis, Linn. * There are many cultivated varieties. The American type of the plant appeared in England in 1820 (J. communis var. Canadensis.)
  J. occidentalis, Hook. Orcutt 1891. (Eng.)
  J. pachyphlœa, Torr. (Eng.)
  J. Sabina, Linn., var. procumbens, Pursh.* (Eng.)
  J. Virginiana, Linn. * Many cultivated varieties.
Larix. Eight species; 3 in our territory.
  L. Americana, Michx. * (Eng.)
  L. Lyallii, Parlat. (Eng.)
  L. occidentalis, Nutt. (Eng.)
Libocedrus. About 8 species; we have one.
  L. decurrens, Torr.* (Eng. 1884.) Known in cultivation, often, as Thuja gigantea.
Picea. A dozen species; half in this country.
  P. (Abies) alba, Linn. * (Eng. 1700.) Two or three garden varieties are in the catalogues.
  P. Breweriana, Watson. (Eng. 1886.)
  P. Englemanni, Engelm. * (Eng. 1864.)
  P. (Abies) nigra, Linn. * (Eng. 1700.) There is a dwarf variety, and one or two others.
  P. pungens, Engelm. *
  P. Sitchensis, Carr. (Abies Menziesii.) Orcutt 1891. (Eng. 1831).
Pinus. Some 70 species; 36 in our region.
  P. albicaulis, Engelm. (Eng. 1846.)
  P. Balfouriana, Jeffrey. F. Kelsey 1890. (Eng. 1852.)
  P. Balfouriana var. aristata, Engelm. (Eng. 1870.)
  P. Banksiana, Lamb. *
  P. clausa, Vasey. (P. inops var. clausa.) Reasoner.
  P. contorta. Dougl. * (Eng. 1831.)
  P. Coulteri, Don. * (Eng. 1832.)
  P. Cubensis, Griseb. *
  P. edulis, Engelm. *
  P. flexilis, James. * (Eng. 1851.)
  P. inops, Ait. *
  P. insignis, Dougl., * (or tuberculata of Don.) (Eng. 1833.)
  P. Jeffreyi, Murray. * (Eng. 1852.)
  P. Lambertiana, Dougl. Orcutt 1891. (Eng. 1827.)
  P. mitis, Michx. *
  P. monophylla, Torr. & Fremont. * (Eng. 1847.)
  P. monticola, Dougl. * (Eng. 1831.)
  P. muricata, Don. * (Eng. 1846.)
  P. Murrayana Balfour. * (Eng.)
  P. palustris, Mill. (P. australis.)* (Eng.)
  P. Parryana, Engelm. Orcutt 1891.
  P. ponderosa, Dougl. * (Eng. 1827.)
  P. pungens, Michx. f. * (Eng.)
  P. resinosa, Ait. *
  P. rigida, Mill. * (Eng. 1759.)
  P. Sabiniana, Dougl. Orcutt 1891. (Eng. 1832.)
  P. Strobus, Linn. * (Eng. 1705.)
  P. Torreyana, Parry. *
  P. tuberculata, Gordon. Orcutt 1891. (Eng. 1847.)
Pseudotsuga. A genus of a single American species.
  P. Douglasii, Carr.* (Eng. 1826.)
  P. Douglasii var. macrocarpa, Engelm. Orcutt 1891.
Sequoia. Two Pacific species.
  S. gigantea, Decsne. * (Eng. 1853.)
  S. gigantea, h. var. aurea. (Eng.)
  S. gigantea, h. var. pendula. (Eng. 1871.)
  S. sempervirens, Endl. * (Eng.)
  S. sempervirens h. var. albospica. (Eng.)
  S. sempervirens h. var. glauca. (Eng.)
Taxodium. Three species; 1 American.
  T. distichum, Richard. * (Eng. 1640.) There is a weeping variety.
Taxus. Six or eight species; 3 in this area.
  T. brevifolia, Nutt. (Eng.)
  T. Canadensis, Willd. * (Eng. 1800.)
Thuya. A dozen species; 2 in our region.
  T. gigantea, Nutt. * (Eng.) Known in cultivation as T. plicata and T. Lobbii. (See Libocedrus decurrens.)

T. occidentalis, Linn. * (Eng. 1596.) As many as two dozen named varieties are in cultivation.
Torreya. About 4 species; two American.
T. Californica, Torr. * (Eng. 1851.)
T. taxifolia, Arn. * (Eng. 1840.)
Tsuga. Five or 6 species; 4 in our region.
T. (Abies) Canadensis, Carr. * (Eng. 1736.) Several varieties in cultivation.
T. Caroliniana, Engelm. Kelsey 1884. (Eng. 1886.)
T. Mertensiana, Carr. (Eng. 1851.)
T. Pattoniana Engelm. (T. Hookeriana, T. Roezlii of Carrière?) (Eng. 1854.)

CYCADACEÆ, CYCAD FAMILY.
Zamia. About 30 species; we have 2.
Z. integrifolia, Jacq. * (Eng. 1758.)

ORCHIDACEÆ, ORCHID FAMILY.
Aplectrum. Single species.
A. hiemale, Nutt. *
Arethusa. Three species; 1 in our region.
A. bulbosa, Linn. Gill. 1881. (Eng.)
Bletia. About 20 species; we have 1.
B. verecunda, Swartz. Gill. 1881.
Calopogon. Four species, all American.
C. pulchellus, R. Br. * (Eng. 1791.)
Calypso. Single species.
C. borealis, Salisb. Gill. 1881.
Corallorhiza. Species 8 in our region; a dozen altogether.
C. Mertensiana, Bong. Gill. 1881.
C. multiflora, Nutt. Gill. 1881.
Cypripedium. About 40 species; in our region 11.
C. acaule, Ait. * (Eng. 1786.)
C. arietinum, R. Br. * (Eng. 1808.)
C. Californicum, Gray. Gill. 1881.
C. candidum, Muhl. * (Eng. 1826.)
C. montanum, Dougl. (C. occidentale.) *
C. parviflorum, Salisb. * (Eng. 1759.)
C. pubescens, Willd. * (Eng. 1790.)
C. spectabile, Swartz. * (Eng. 1731.) Varieties album and roseum are catalogued.
Cyrtopodium. Twenty species; 1 reaching South Florida.
C. punctatum, Lindl. * (Eng.)
Dendrophylax. One species grows in South Florida; 2 others.
D. Lindenii, Benth. Reasoner.
Epidendrum. About 400 species; 8 in our limits.
E. bidentatum, Linn. *
E. cochleatum, Linn. *
E. conopseum, Ait. *
E. nocturnum, Linn. Reasoner.)
E. rigidum, Swz. Reasoner.
E. venosum, Lindl.?*
Goodyera. We have 3, out of 25.
G. Menziesii, Lindl. *
G. pubescens, R. Br. *
G. quercicola, Lindl. Gill. 1881.
G. repens, R. Br. *
Habenaria. About 400 species; 34 in our territory.
H. blephariglottis, Torr. Gill. 1881. (Eng. 1820.)
H. bracteata, R. Br. Gill. 1881.
H. ciliaris, R. Br. * (Eng. 1796.)
H. cristata, R. Br. Gill. 1881. (Eng. 1806.)
H. dilatata, Gray. Gill. 1884. (Eng. 1823.)
H. elegans, Bolander. Gill. 1881.
H. fimbriata, R. Br.* (Eng. 1789.)
H. Hookeri, Torr. Gill. 1881. (Eng. 1822.)
H. hyperborea, R. Br. Gill. 1881.
H. lacera, R. Br. *
H. leucophæa, Gray. Gill. 1881.
H. leucostachys, Watson. Gill. 1881.
H. (Gymnadenia) nivea, Spreng. Reasoner,
H. obtusata, Rich. Gill. 1881.
H orbiculata, Torr. Gill. 1881. (Eng.)
H. psycodes, Gray. *
H. tridentata, Hook. *
H. Unalaschensis, Watson. Gill. 1881.
H. virescens, Spreng. *
Liparis. We have 2 species, out of 100.

L. liliifolia, Rich. Gill. 1881. (Eng.)
L. Lœsellii, Rich. Gill. 1881.
Listera. Ten species; we have 3.
L. convallarioides, Nutt. Gill. 1884.
L. cordata, R. Br. Gill. 1884.
Orchis. About 80 species; 2 in our region.
O. rotundifolia, Pursh. Gill. 1881. (Eng.)
O. spectabilis, Linn. Gill. 1881. (Eng. 1801.)
Pogonia. About 30 species; we have 5.
P. divaricata, R. Br. Gill. 1881.
P. ophioglossoides, Nutt. Gill. 1881. (Eng. 1816.)
P. pendula, Lindl. Gill. 1881, (Eng. 1824.)
P. verticillata, Nutt. Gill. 1881.
Polystachya. About 40 species; 1 in south Florida.
P. luteola, Hook. (Dendrobium polystachyon.) * (Eng. 1818.)
Ponthieva. One species; 10 in all.
P. glandulosa, R. Br. Gill. 1881.
Spiranthes. Some 80 species; 13 in our region.
S. cernua, Rich. * (Eng. 1796.)
S. gracilis, Bigelow. Gill. 1881.
S. latifolia, Torr. Gill. 1881.
S. præcox, Watson. (S. graminea.) Hors. 1889.
S. Romanzoffiana, Cham. Wool. 1883.
S. simplex, Gray. Hors. 1889.
Tipularia. Species 2; 1 Asian, 1 American.
T. discolor, Nutt. *
Vanilla. One species in our region; 20 in all.
V. planifolia, Andr. * (Eng. 1800.)

Scitamineæ, Cardamon Family.

Canna. 30 species; 1 in our region.
C. flaccida, Roscoe. Reasoner. (Eng. 1788.)
Thalia. Species about 5; 2 in our region.
T. dealbata, Roscoe. (Eng. 1791.)
T. divaricata, Chapm. *

Bromeliaceæ, Bromelia or Pineapple Family.

Catopsis. One species in this region; about 8 in all.
C. nitida, Baker. (Eng. 1823.)
Tillandsia. About 120 species; a dozen in our region.
T. bulbosa, Hook. * (Eng. 1823.)
T. cæspitosa, Le Conte. *
T. recurvata, Pursh. *
T. usneoides, Linn. * (Eng. 1877.)
T. utriculata, Le Conte. * (Eng. 1793.)

Hæmodoraceæ, Bloodwort Family.

Aletris. Eight species; 2 in our region.
A. aurea, Walt. Kelsey '90-'91. (Eng. 1811.)
A. farinosa, Linn. * (Eng. 1768.)
Lachnanthes. One species, North American.
L. tinctoria, Ell. (Eng. 1812.)
Lophiola. One species; North American.
L. aurea, Ker. (Eng. 1811.)

Iridaceæ, Iris Family.

Alophia. Three or four species; we have 2 (Herbertia and Trifurcia).
A. (Herbertia) cærulea, Benth. & Hook. (Eng. 1842.)
A. (Herbertia) Drummondiana, Herb. (Eng. 1839.)
Iris. One hundred species; 19 in this region.
I. bracteata, Wats. Hors. 1889 (1888.)
I. Caroliniana, Wats. U. S. Nurseries 1889.
I. cristata, Ait. * (Eng. 1756.)
I. Douglasiana, Herb. (Eng. 1873.)
I. fulva, Ker. (Eng.)
I. Hartwegi, Baker. Gill. 1881.
I. hexagona, Walt. * (Eng.)
I. longipetala, Herb. Hors. 1889. (Eng. 1862.)
I. macrosiphon, Torr. var. flavum. Hors. 1889 (1888).
I. Missouriensis, Nutt. (I. Tolmieana, Hub.) Gill. 1881. (Eng. 1880.)
I. prismatica, Pursh. (I. Virginica, Gray.)* (Eng. 1758.)
I. tenax, Dougl. Gill. 1881. (Eng. 1826.)
I. tripetala Walt. (I. tridentata.) (Eng. 1829.)
I. verna, Linn. Wool. 1883. (Eng. 1748.)
I. versicolor, Linn. Gill. 1881. (Eng. 1732.)

Nemastylis. We have 4 out of 6.
N. acuta, Herb. Wool. 1883. (Eng. 1875.)
N. cœlestina, Nutt.* (Eng. 1882.)
Sisyrinchium. About 50 species; we have 10.
S. bellum, Watson. Gill. 1881.
S. Bermudiana of Gill. 1881. May be either S. angustifolium, Mill., or S. anceps, Cav.
S. Californicum, Ait. f. (Eng. 1796.)
S. grandiflorum, Dougl. Gill. 1881. (Eng. 1826.)
S. mucronatum, Michx. Gill. 1881.
Tigridia. Seven or eight species; 1 in our region.
T. buccifera, Wats. Hors. 1889.

AMARYLLIDACEÆ, AMARYLLIS FAMILY.
Agave. About twenty species; mostly American.
A. deserti, Engelm. Orcutt 1891. (Eng. 1877.)
A. Palmeri, Engelm. Orcutt 1891.
A. Parryi, Engelm. Orcutt 1891.
A. Poselgerii, Texas. (Eng.)
A. Pringlei, Engelm. "A mountain form of A. deserti, rare and beautiful." Orcutt 1891.
A. Schottii, Engelm. Orcutt 1891.
A. Shawii, Engelm.* (Eng. 1877.)
A. Utahensis, Engelm. (Eng. 1881.)
A. variegata, Texas. (Eng. 1865.)
A. Virginica, Linn.* (Eng. 1765.)
Cooperia. Species 2; Texas and Mexico.
C. Drummondii, Herb. Wool. 1883.
C. pedunculata, Herb. G. & H. 1891.
Crinum. Species over 60; 1 American.
C. Americanum, Linn. * (Eng. 1752.)
Hymenocallis. Species 30 or more, in the western hemisphere; 11 within our limits.
H. (Pancratium) Caribæa, Herb.*
H. lacera, Salisb. (Pancratium rotatum.) * (Eng. 1803.)
Hypoxis. Species over 50; 3 American.
H. erecta, Linn. Gill. 1881. (Eng. 1752.)
Pancratium. See Hymenocallis above.
Zephyranthes. About 30 species, American; 4 within the limits of the United States.
Z. Atamasco, Herb. (Amaryllis Atamasco.)*
Z. longifolia, Hemsl. Hors. 1889 (1886).
Z. Texana, Herb. *
Z. Treatiæ, Watson. Wool. 1883.

DIOSCOREACEÆ, YAM FAMILY.
Discorea. About 15 species; 1 in this country.
D. villosa, Linn. Gill. 1881.

LILIACEÆ, LILY FAMILY.
Allium. About 250 species; we have 54.
A. acuminatum, Hook. (A. Murrayanum.) Gill. 1881. (Eng. 1840.)
A. acuminatum "var. rubrum." "Flowers deep red-purple; in other respects like the type California." Dict. Gard.
A. anceps, Kellogg. Gill. 1881.
A. attenuifolium, Kellogg. Hors. 1889. (Eng.)
A. Bidwelliæ, Wats. Gill. 1881.
A. Breweri, Wats. (Eng. 1882.)
A. cernuum, Roth. *
A. Cusickii, Wats. *
A. falcatum. Hors. 1889 (1888). "Four to 6 in.; flowers red-purple; N.W." Horsford. A. falcifolium?
A. falcifolium, Hook. & Arn. Orcutt 1891. (Eng. 1880.)
"A. falciforme." (Eng. 1882.) "Probably a variety of A. unifolium, with pure white flowers, in several-flowered umbels." Dict. Gard.
A. fimbriatum, Wats. Orcutt, 1891.
A. Geyeri, Wats. Wool. 1883.
A. hæmatochiton, Wats. Hors. 1889 (1884).
A. Macnabianum, Regel. "Cultivated from bulbs probaably collected in Oregon, cannot be identified from the description in Regel's Monographia Alliorum." Watson. (Eng.)
A. madidum, Wats. Hors. 1889.
A. mutabile, Michx. (Nothoscardum inodorum of Dict. Gard.) (Eng. 1770 & 1824.)

A. Nevadense, Wats. (Eng. 1882.)
A. platycaule, Wats. Hors. 1889 (1884).
A. reticulatum, Fraser. * (Eng. 1882.)
A. Sanbornii, Wood. Hors. 1889.
A. scaposum, Benth. Hors. 1889 (1885).
A. Schœnoprasum, Linn. Wool. 1883.
A. serratum, Wats. Wool. 1883.
A. stellatum, Fraser. Wool. 1883.
A. tricoccum, Ait. *
A. unifolium, Kellogg. Gill. 1881. (Eng. 1873.)
A. validum, Wats. Wool. 1883. (Eng. 1881.)
Amianthium. Single species in our territory.
A. muscætoxicum, Gray. Wool. 1883. (Eng. 1758.)
Androstephium. Two, American.
A. violaceum, Torr. Wool. 1883. (Eng. 1874.)
Bloomeria. Three species, Californian.
B. aurea, Kellogg, Gill. 1881.
B. Clevelandi, Wats. Orcutt, 1891.
Brevoortia. Species one.
B. (Brodiæa) coccinea, Wats. Wool. 1883. (Eng. 1870.)
Brodiæa. There are 26 in our region.
B. Bridgesii, Wats. Hors. 1889 (1884).
B. capitata, Benth. Wool. 1883. (Eng. 1871.)
B. capitata var. alba. Hors. 1889.
B. congesta, Smith. Gill. 1881. (Eng. 1806.)
B. Douglasii, Wats. (Eng. 1876.)
B. gracilis, Wats. Gill. 1881. (Eng. 1876.)
B. grandiflora, Smith. Gill. 1880. (Eng. 1806.)
B. Howellii, Wats. Gill. 1881. (Eng. 1880.)
B. hyacinthina (Triteleia hyacinthina, Greene). Orcutt 1891.
B. ixioides, Wats. (Calliprora lutea.) Gill. 1881. (Eng. 1831.)
B. lactea, Watson. Gill. 1881. (Eng. 1833.)
B. (Triteleia) laxa, Wats. Gill. 1881. (Eng. 1832.)
B. minor, Watson. Gill. 1881.
B. multiflora, Benth. Gill. 1881. (Eng. 1872.)
B. Orcuttii, (Greene.) Orcutt 1891.
B. peduncularis, Wats. Orcutt 1891.
B. stellaris, Wats. Hors. 1889 (1884).
B. terrestris, Kellogg. Gill. 1881.
Calochortus. American, 34 species.
C. albus, Dougl. Gill. 1881. (Eng. 1832.)
C. albus, Dougl., var. paniculatus. Baker. Hors. 1889.
C. aureus, Wats. Orcutt 1891.
C. Benthami, Baker. Gill. 1881.
C. cæruleus, Wats. Hors. 1889 (1884).
C. elegans, Pursh. Gill. 1881. (Eng. 1826.)
C. elegans var. nanus, Wood. Gill. 1881.
C. flexuosus, Watson. Gill. 1881.
C. Greenei, Watson. Gill. 1881.
C. Gunnisoni, Wats. Wool. 1883. (Eng.)
C. Howellii, Wats. Hors. 1889 (1888).
C. Kennedyi, Porter. G. & H. 1891. Orcutt 1891.
C. Leichtlinii, Hook. f. "A low mountain form of C. Nuttellii. Orcutt 1891.
C. lilacinus, Kellogg. Wool. 1883. (Eng. 1868.)
C. lilacea. (C. lilacinus ?) Hors. 1889.
C. longebarbatus, Wats. Hors. 1889 (1884).
C. luteus, Dougl. Gill. 1881. (Eng. 1831.)
C. luteus var. citrinus, Wats. Hors. 1889. Sold as a variety of C. venustus.
C. luteus, Benth. var. oculatus, Wats. Hors. 1889. Sold as a variety of C. venustus.
C. macrocarpus, Dougl. Gill. 1881. (Eng. 1826.)
C. Maweanus, Leicht. Gill. 1881. (Eng.)
C. nitidus, Dougl. Orcutt 1891.
C. nudus, Watson. Gill. 1881.
C. Nuttallii, Torr. & Gr. Gill. 1881. (Eng. 1869.)
C. Palmeri, Wats. Orcutt 1891.
C. pulchellus, Dougl. Wool. 1883. (Eng. 1832.)

C. splendens, Dougl. Gill. 1881. (Eng. 1832.)
C. uniflorus, Hook. & Arn. Orcutt 1891.
C. venustus, Benth. Gill. 1881. (Eng. 1836.) (See C. luteus.)
C. venustus var. purpurascens, Wats. Orcutt 1891.
C. venustus var. roseus. Hors. 1889.
C. Weedii, Wood. Hors. 1889 (1884).

Camassia. Five species; N. American.
C. Cusickii, Wats. Hors. 1889 (1886). Wool. about 1889.
C. esculenta, Lindl. Wool. 1883.
C. Fraseri, Torr. * (Eng.)
C. Leichtlinii, Wats. G. & H. 1891.

Chlorogalum. Three species, Californian.
C. angustifolium, Kellogg. Orcutt 1891.
C. parviflorum, Wats. Orcutt 1891.
C. pomeridianum, Kunth. Wool. 1883. (Eng. 1819.)

Clintonia. A half dozen species, 4 here (see also Downingia Lobeliaceæ).
C. Andrewsiana, Torr. Gill. 1881. (Eng.)
C. borealis, Raf. Gill. 1881. (Eng. 1778.)
C. umbellata, Torr. Kelsey '89–'90. (Eng. 1778.)
C. uniflora, Kunth. Gill. 1881. (Eng.)

Convallaria. Single species.
C. majalis, Linn. Gill. 1881. Native also to Europe, whence the stock probably comes.
C. majalis var. rosea. Wool. 1883.

Dasylirion. Two species in our region, out of 8.
D. graminifolium is catalogued by Reasoner; but whether the plant is the Mexican D. graminifolium or D. Texanum—which is also known as D. graminifolium—does not appear.
D. Wheeleri, Wats. Reasoner.

Disporum. Twelve species; 8 in our region (including Prosartes).
D. Hookeri, Benth. & Hook. (Eng.)
D. lanuginosum, Benth. & Hook. (Eng. 1758.)
D. (Prosartes) Menziesii, Benth. & Hook. Gill. 1881.
D. (Prosartes) Oreganum, Benth. & Hook. Gill. 1881.
D. (Prosartes) trachycarpum, Benth. & Hook. Hors. 1889.
D. Menziesii, Benth. & Hook. (Eng.)

Erythronium. About 15 species; 13 in this country.
E. albidum, Nutt. Gill. 1881.
E. albidum var. coloretum. S. W. states. Hors. 1889 (1888).
E. Americanum, Ker. * (Eng.)
E. citrinum, Wats. *
E. giganteum, Lindl. Gill. 1881.
E. grandiflorum, Pursh. Gill. 1881. (Eng.)
E. grandiflorum var. albiflorum, Hook. Orcutt 1891. Supposed by some to be identical with E. giganteum.
E. grandiflorum var. minor, Morren. Hors. 1889.
E. Hendersoni, Wats. Hors. 1889 (1888).
E. Howellii, Wats. Orcutt 1891.
E. purpurascens, Watson. Gill. 1881.
E. revolutum, Smith. (Erythronium Smithii.) Hors. 1889 (1885).

Frittillaria. Some 50 species; 8 in our region (including Liliorhiza).
F. atropurpurea, Nutt. Gill. 1881.
F. biflora, Lindl. Wool. 1883.
F. lanceolata, Pursh. Gill. 1881. (Eng. 1872.)
F. liliacea, Lindl. (Liliorhiza lanceolata.) Gill. 1881.
F. parviflora, Torr. Gill. 1881.
F. pudica, Spreng. Gill. 1881. (Eng.)
F. recurva, Benth. Gill. 1881. (Eng. 1870.)

Helonias. One species, N. American.
H. bullata, Linn. * (Eng. 1758.)

Hesperocallis. One species, N. American.
H. undulata, Gray. Wool. 1883.

Leucocrinum. Single species.

L. montanum, Nutt. Hors. 1889 (1887).
Lilium. About 50; 15 in this country.
L. Bolanderi, Wats. *
L. Canadense, Linn. * (Eng. 1829.)
L. Canadense var. flavum. Hors. 1889.
L. Canadense var. rubrum. Wool. 1883. "Var. maximum."*
L. Carolinianum, Michx. G. & H. 1891. (Eng.)
L. Catesbæi, Walt. * (Eng.)
L. Columbianum, Hans. *
L. Grayi, Wats. Kelsey '90–'91. G. & H. 1891. Perhaps introduced sparingly a couple of years earlier by Kelsey.
L. Humboldtii, Roezl. & Leichtl. Gill. 1881. (Eng. 1872.)
L. maritimum, Kell. Gill. 1881.
"L. nitidum." Introduced from California in 1880 to England, according to Dict. Gard. The species is not identified with American descriptions.
L. pardalinum, Kell. * (Eng. 1875.)
L. pardalinum var. angustifolium, Kellogg. (L. Roezlei.) Wool. 1883. (Eng. 1871.)
L. Parryi, Watson. Gill. 1881. (Eng. 1879.)
L. parvum. Kellogg. (L. Canadense var. parvum.) Gill. 1881. (Eng.)
L. Philadelphicum, Linn. Gill. 1881. (Eng. 1754.)
L. rubescens, Wats. (L. Washingtonianum var. purpureum. Wool. 1883. (Eng. 1872.)
L. superbum, Linn. * (Eng.)
L. Washingtonianum, Kell. * (Eng. 1872.)
Lloydia. Species 2; 1 in America.
L. serotina, Reich. Hors. 1889.
Maianthemum. Two species.
M. (Smilacina) bifolium, DC. Gill. 1881.
Medeola. Species 1.
M. Virginica, Linn. Gill. 1881. (Eng. 1759.)
Melanthium. Three species, N. American.
M. Virginicum, Linn. Kelsey '91 –'92. (Eng.)
Milla. One species.
M. biflora, Cav. Hors. 1889.
Nolina. About a dozen species; 8 in our region.
N. Bigelovii, Wats. Orcutt 1891.
N. Georgiana, Michx. (Eng. 1812.)
Nothoscordum. About 10 species; 1 in this country.
N. fragrans (Eng. 1822), of Dict. Gard. is probably not American, unless it may be N. striatum.
N. (Allium) striatum, Kunth. Wool. 1883. (Eng.)
Oakesia. Species 2.
O. (Uvularia) puberula, Wats. (Eng. 1824.)
O. (Uvularia) sessilifolia, Wats. Wool. 1883. (Eng. 1790.)
Pleea. One species.
P. tenuifolia, Michx. (Eng. 1824.)
Polygonatum. Two dozen species; 2 in this country.
P. biflorum, Ell. (P. multiflorum.) * (Eng.)
P. giganteum, Dietr. Kelsey '91 –92.
Prosartes. See Disporum.
Smilacina. Twenty species; a half dozen in this country.
S. racemosa, Desf. Gill. 1881. (Eng. 1640.)
S. stellata, Desf. Gill. 1881. (Eng. 1633.)
S. sessilifolia, Nutt. Gill. 1881.
Smilax. Nearly 200 species: 17 in this region.
S. auriculata, Walt. (Eng. 1884.)
S. Bona-nox, Linn. (Eng. 1739.)
S. glauca, Walt. (Eng. 1815.)
S. herbacea, Linn. (Eng. 1699.)
S. hispida, Muhl. *
S. lanceolata, Linn. (Eng. 1785.)
S. Pseudo-China, Linn. (Eng. 1739.)
S. rotundifolia, Linn. (Eng.)
Stenanthium. Five species; 3 here.
S. angustifolium, Gray. (And var. gramineum.) (Eng.)
S. occidentale, Gray. Hors. 1889. (Eng. 1881.)
Streptopus. We have three of the four species.
S. amplexifolius, DC. Gill. 1881.
S. roseus, Michx. Gill. 1881.
Stropholirion. Single species.

S. Californicum, Torr. (Brodiæa volubilis.) (Eng. 1874.)
Tofieldia. Some 14 species; 6 in this region.
T. pubescens, Pers. (Eng. 1840.)
Trillium. A dozen species.
T. cernuum, Lam. Gill. 1881. (Eng. 1758.)
T. erectum, Linn. Gill 1881. (Eng. 1759.)
T. erectum var. album, Pursh. Gill. 1881. (Eng.)
T. erectum "var. ochroleucum." "Yellowish white." Dict. Gard. Bot. Mag. t. 3250.
T. erythrocarpum, Michx. Gill. 1881. (Eng. 1811.)
T. grandiflorum, Salibsb. * (Eng. 1799.)
T. nivale, Riddell. Gill. 1881. (Eng. 1879.)
T. ovatum, Pursh. Gill. 1881. (Eng. 1810, as T. obovatum.)
T. petiolatum, Pursh. Gill. 1881.
T. recurvatum, Beck. Gill. 1881.
T. sessile, Linn. Gill. 1881. (Eng. 1759.)
T. sessile var. Californicum, Wats. Hors. 1889 (1884).
T. sessile var. Wrayi, Wats. T. discolor. Wool. 1883. (Eng. 1831.)
T. stylosum, Nutt. Kelsey 1889. (Eng. 1823.)
Triteleia. See Brodiæa.
Uvularia. Four or five; 2 in this country. (See Oakesia.)
U. grandiflora, Smith. * (Eng. 1802.)
U. perfoliata, Linn. * (Eng. 1710.)
Veratrum. Eight or 9 species; 5 in our region.
V. viride, Ait. (Eng. 1742.)
Xerophyllum. Species 3, American.
X. setifolium, Michx. (X. asphodeloides.) * (Eng. 1765.)
X. tenax, Nutt. Gill. 1881.
Yucca. We have a dozen species.
Y. aloifolia, Linn. *
Y. angustifolia, Pursh. * (Eng. 1811.)
Y. angustifolia var. mollis, Engelm. (Y. stricta.) (Eng. 1817.)
Y. baccata, Torr. * (Eng. 1873.)
Y. brevifolia, Engelm. *
Y. canaliculata, Hook. * (Y. Treculiana.) (Eng. 1858.)
Y. elata, Engelm. (Y. constricta.) (Eng. 1862.)
Y. filamentosa, Linn. * (Eng. 1675.)
Y. filamentosa var. flaccida, Engelm. (Y. exigua, Y. glauca.) (Eng. 1873, 1814.)
Y. gloriosa, Linn. * (Eng. 1596.)
Y. macrocarpa, Engelm. * (Eng.)
Y. rupicola, Scheele. Wool. 1883. (Eng.)
Y. Whipplei, Torr. * (Eng. 1876.)
Zygadenus. A dozen species; 9 here.
Z. angustifolius, Wats. (Eng. 1823.)
Z. elegans, Pursh. (Z. glaucus.) Wool. 1883. (Eng. 1828.)
Z. Fremonti, Torr. Hors. 1889. (Eng. 1874.)
Z. glaberrimus, Michx. (Eng. 1811.)
Z. leimanthoides, Gray. Kelsey '91-'92.
Z. Nuttallii, Gray. Wool. 1883. (Eng. 1883.)
Z. paniculatus, Wats. Hors. 1889.
Z. venenosus, Watson. *

PONTEDERIACEÆ, PICKEREL-WEED FAMILY.
Heteranthera. Eight species, half in our region.
H. limosa, Vahl. (Eng.)
H. reniformis, Ruiz. & Pav. (Eng. 1824.)
Pontederia. Seven or 8; we have but 1.
P. cordata, Linn. * (Eng. 1579.)

COMMELINACEÆ, SPIDERWORT FAMILY.
Commelina, About 90 species; 5 in our region.
C. erecta, Linn. (Eng.)
C. Virginica, Linn. (Eng.)
Tradescantia. Over 30; a half-dozen here.
T. rosea, Vent. Kelsey '90-'91. (Eng. 1802.)
T. Virginica, Linn. * (Eng. 1629.) There are several named varieties in cultivation.
T. Virginica "var. alba." Wool. 1883.

JUNCACEÆ, RUSH FAMILY.
Juncus. About 200 species; 70 in our region.
J. effusus, Linn. *

PALMÆ, PALM FAMILY.
Erythea. Two species, Californian.
E. armata, Wats. * (Eng. 1887.)
E. (Brahea) edulis, Wats. * (Eng.)
Oreodoxa. One species in our region; 5 in all.
O. regia, HBK. * (Eng. 1836.)
Pseudophœnix. One species in S. Florida.
P. Sargenti, Wendl. * (Eng. 1887.) Discovered on Elliott's Key, S. Florida, in 1886, by Professor C. S. Sargent.
Rhapidophyllum. Single species, S.E. States.
R. (Chamærops) Hystrix, Wendl. & Drude. * (Eng. 1801.)
Sabal. Six species; 3 in our region.
S. Adansonii, Guerns. * (Eng. 1810.)
S. Palmetto, Roem. & Schult. * (Eng. 1825.)
Serenoa. Single species.
S. serrulata, Benth. & Hook. * (Eng. 1840.)
Thrinax. About 10 species; 3 in our region.
T. argentea, Loddiges. * (Eng. 1830.)
T. parviflora, Swz. * (Eng. 1778.)
Washingtonia. Species 2.
W. filifera, Wendl. * (Eng.) Known also as Brahea and Pritchardia.
W. robusta, Wendl. * (Eng.)

TYPHACEÆ, CATTAIL FAMILY.
Typha. Ten species; 3 in our region.
T. latifolia, Linn. *

ARACEÆ, ARUM FAMILY.
Acorus. Species 2; 1 in our region.
A. Calamus, L. *
A. Calamus var. variegatus. Wool. 1883. Cultivated varieties probably from Europe, where the plant is native.
Arisæma. About 50 species; 3 American.
A. Dracontium, Schott. Gill. 1881. (Eng. 1759.)
A. triphyllum, Torr. * (Eng. 1664.)
Calla. Species 1; Europe and America.
C. palustris, Linn. Gill. 1881.
Orontium. Species 1; American.
O. aquaticum, Linn. *
Peltandra. Species 2; American.
P. undulata. Raf. (P. Virginica.)* (Eng. 1759.)
Pistia. A single species.
P. stratiotes, Linn., var. spathulata, Engler *
Symplocarpus. Species 1; American and Asian.
S. fœtidus, Salisb. *
Xanthosoma. Twenty-five species; one in our region.
X. sagittifolium, Schott. (Eng. 1710.)

ALISMACEÆ, WATER-PLANTAIN FAMILY.
Sagittaria. Species 15 or 20; 11 American.
S. graminea, Michx. (Eng. 1812.)
S. heterophylla, Pursh. (Eng. 1822.)
S. variabilis, Engelm. * (Eng. 1818.)

CYPERACEÆ, SEDGE FAMILY.
Carex. Some 800 or 900 species; in our region there are 274.
C. Grayii, Carey. (Eng. 1879.)
C. intumescens, Rudge. (Eng.)
Scirpus. Species about 300; in our limits 28.
S. atrovirens, Muhl. G. & H. 1891.
S. riparius, Spreng. (Isolepis gracilis.) *
Scleria. About 100 species; 11 in our territory.
S. ciliata, Michx. (Eng. 1823.)
S. verticillata, Muhl. (Eng. 1825.)

GRAMINEÆ, GRASS FAMILY.
Agrostis. Species 100; in our region 27.
A. alba, Linn, (A. stolonifera, A. vulgaris.) * Apparently native in mountainous regions, but introduced into cultivation from Europe.
A. canina, Linn. *
Ammophila. Four species; 1 in our region.
A. arundinacea, Host. (Calamagrostis arenaria.) *
Arundinaria. We have one species, out of a total of 24.
A. macrosperma, Michx., var. suffruticosa, Munro. (A. tecta.) *

Calamagrostis. There are 31 species in our region.
C. brevipilis, Gray. Gill. 1881.
Chrysopogon. About 20 species; of which we have 3.
C. (Sorghum) nutans, Benth. Gill. 1881.
Festuca. Twenty-one in our region; in all, some 230.
F. amethystina, Linn. *
F. duriuscula, Lam. * Native also in Europe, whence the cultivated plant has come.
F. ovina, Linn. * (See note under above.)
F. rubra, Linn. * (See note under above.)
Glyceria. Species 30; 11 in this country.
G. grandis, Watson. (G. or Poa, aquatica.) *
Hordeum. A dozen species; 2 in this country.
H. jubatum, Linn. * (Eng. 1782.)
Panicum. Nearly 300 species; in this country, 67.
P. virgatum, Linn.* (Eng. 1781.)
Phalaris. About 10 species; 4 in our region.
P. arundinacea, Linn. * Native also to Europe, whence the ribbon-grass of the gardens (var. picta or var. variegata) probably came, and also the green-leaved form, grown for hay.
Phleum. Ten species; 2 in our region.
P. pratense, Linn. * Native also to Europe, whence it has come into cultivation.
Poa. About 200 species in all; of which we have 53.
P. arachnifera, Torr. *
P. nemoralis, Linn. * Perhaps not the P. nemoralis of botanists.
P. pratensis, Linn. *
Stipa. About 100 species; 23 here.
S. pennata, Linn. *
Tripsacum. Two species in our region; 3 or 4 in all.
T. dactyloides, Linn. *
Uniola. Species 4; North American.
U. latifolia, Michx. Wool. 1883. (Eng.)
U. paniculata, Linn. * (Eng.)
Zizania. Single species.
Z. aquatica, Linn. *

EQUISETACEÆ, HORSETAIL FAMILY.

Equisetum. In our region 13 species.
E. arvense, Linn. Gill. 1884.
E. hiemale, Linn. Gill. 1884.

FILICES, FERN FAMILY.

Acrostichum. But one species in America.
A. aureum, Linn. *
Adiantum. We have 5 species.
A. Capillus-Veneris, Linn. *
A. emarginatum, Hook. Gill. 1881.
A. pedatum, Linn. *
Aneimia. Two species in our region.
A. adiantifolia, Swz. (Eng. 1793.)
Aspidium. Two dozen species grown in this country.
A. acrostichoides, Swz. * (Eng.)
A. aculeatum, Swz. *
A. aculeatum, Swartz, var. Braunii, Doell. *
A. Bootii, Tuckerm. Hors. 1889.
A. cristatum, Swz. *
A. cristatum var. Clintonianum, Eaton. Gill. 1881.
A. Floridanum, Eaton. Gill. 1881. (Eng.)
A. Filix-mas, Swz. *
A. fragrans, Swz. Gill. 1881.
A. Goldieanum, Hook. * (Eng.)
A. Lonchitis, Swz. *
A. marginale, Swz.* (Eng. 1772.)
A. munitum, Kaulf. * (Eng.)
A. Nevadense, Eaton. Gill. 1881.
A. Noveboracense, Swz. * (Eng. 1812.)
A. patens, Swz. Gill. 1881.
A. rigidum, Swz., var. argutum, Eaton. *
A. spinulosum, Swz. *
A. spinulosum var. dilatatum, Hornem. *
A. spinulosum var. intermedium, Eaton. *
A. Thelypteris, Swz. *
A. unitum, R. Br., var. glabrum, Mett. Reasoner.
Asplenium. Twenty-one species grow in our region.
A. angustifolium, Michx. Gill. 1881. (Eng.)
A. ebeneum, Ait. * (Eng. 1779.)
A. ebenoides, Scott. Gill. 1881.

A. Filix-fœmina, Bernh. (A. Michauxii. * (Eng.)
A. firmum, Kunze. Gill. 1881.
A. montanum, Willd. (Eng. 1812.)
A. myriophyllum, Presl. Gill. 1881.
A. parvulum, M. & G. Gill. 1881.
A. pinnatifidum, Nutt. * (Eng.)
A. rhizophyllum, Kunze. (Eng. 1680.)
A. Ruta-muraria, Linn. Gill. 1881.
A. septentrionale, Hoffm.*
A. thelypteroides, Michx.* (Eng. 1823.)
A. Trichomanes, Linn. *
A. Trichomanes var. incisum, Moore. Orcutt 1891.
A. viride, Huds. Gill. 1881.
Blechnum. Only a single species in our region.
B. serrulatum, Rich. *
Camptosorus. One species only, in this country.
C. rhizophyllus, Link. * (Eng.)
Ceratopteris. One species.
C. thalictroides, Brong. (Eng.)
Cheilanthes. We have 21 species.
C. (Hypolepis) Californica, Mett. Gill. 1881. (Eng.)
C. Clevelandii, Eaton. Gill. 1881. (Eng.)
C. Cooperæ, Eaton. Gill. 1881.
C. Fendleri, Hook. Gill. 1881. (Eng.)
C. gracillima, Eaton. Gill. 1881. (Eng.)
C. lanuginosa, Nutt. (Eng.)
C. Lindheimeri, Hook. (Eng.)
C. microphylla, Swz.*
C. myriophylla, Desv. Orcutt 1891.
C. tomentosa, Link. Wool. 1883.
C. tomentosa var. Eatoni, Dav. (Eng.)
C. vestita, Swz. Wool. 1883. (Eng. 1812.)
C. viscida, Davenport. Gill. 1881.
C. Wrightii, Hook. (Eng.)
Cryptogamme. One species in our territory.
C. acrostichoides, R. Br. Gill. 1881. (Eng.)
Cystopteris. Species 3 in our limits.
C. bulbifera. Bernh. Gill. 1881. (Eng. 1638.)
C. fragilis, Bernh. *
Dicksonia. One species in this region.
D. pilosiuscula, Willd. * (Eng. 1811.)
Gymnogramme. Two or three species in this country.
G. hispida, Mett. Gill. 1881.
G. triangularis, Kaulf. *
G. triangularis var. viscosa, Eaton. Orcutt 1891.
Lomaria. A single species in our region.
L. spicant, Desv. Gill. 1881.
Lygodium. One species only in North America.
L. palmatum, Swz. Gill. 1875. (Eng.)
Nephrolepis. In North America there are 2 species.
N. exaltata, Schott. * A well-known greenhouse fern.
Notholæna. We have 14 species.
N. candida, Hook. (Eng.)
N. cretacea, Liebm. Hors. 1889.
N. ferruginea, Hook. Wool. 1883.
N. Newberryi, Eaton. Gill. 1881. (Eng.)
N. Parryi, Eaton. Gill. 1881.
N. sinuata, Kaulf. Wool. 1883.
N. tenera, Gillies. Gill. 1881.
Onoclea. We have 2 species (including struthiopteris).
O. sensibilis, Linn. *
O. sensibilis var. obtusilobata. Torr. (Eng.)
O. Struthiopteris, Hoffm. Gill. 1881.
Osmunda. Three species here.
O. cinnamomea, Linn. *
O. Claytoniana, Linn. *
O. regalis, Linn. * There is a var. cristata.
Pellæa. We have 15 species.
P. andromedæfolia, Fée. Gill. 1881.
P. atropurpurea, Link. * (Eng. 1770.)
P. brachyptera, Baker. (Eng. 1873.)
P. Breweri, Eaton. Gill. 1881.
P. Bridgesii, Hook. (Eng. 1875.)
P. densa, Hook. * (Eng.)

P. flexuosa, Link. Gill. 1881.
P. gracilis, Hook. *
P. ornithopus, Hook. Gill. 1881. (Eng. 1878.)
P. Wrightiana, Hook. Gill. 1881.
Phegopteris. In our region there are 6 species.
P. alpestris, Mett. Hors. 1889.
P. Dryopteris, Fée. Gill. 1881.
P. hexagonoptera, Fée. * (Eng. 1811.)
P. polypodioides, Fée. (Polypodium Phegopteris.) Gill. 1881.
Polypodium. There are 11 in this country.
P. aureum, Linn. * (Eng. 1742.)
P. Californicum, Kaulf. Gill. 1881. (Eng.)
P. falcatum, Kellogg. *
P. incanum, Swz. *
P. pectinatum, Linn. * (Eng. 1793.)
P. Phyllitidis, Linn.. * (Eng. 1793.)
P. Scouleri, Hook. & Grev. (Eng.)
P. vulgare, Linn. *
Pteris. There are 4 species in our region.
P. aquilina, Linn. *
P. aquilina, Linn., var. lanuginosa, Bong. Gill. 1881.
P. Cretica, Linn. *
P. serrulata, Linn. f. * (Eng. 1770.)
Schizæa. Single species.
S. pusilla, Pursh. Gill. 1881.
Scolopendrium. But one species in America.
S. vulgare, Smith. *
Tænitis. One species in our region.
T. lanceolata, R. Br. (Eng. 1818.)
Trichomanes. Two species only in our country.
T. Petersii, Gray. Gill. 1881. (Eng. 1875)
T. radicans, Swartz. Gill. 1881.
Vittaria. One species grows in this country.
V. lineata, Smith. *
Woodsia. We have 7 species.
W. glabella, R. Br. Gill. 1881.
W. Ilvensis, R. Br. Gill. 1881.
W. obtusa, Torr. *
W. Oregana, Eaton. * (Eng.)
W. scopulina, Eaton. * (Eng. 1884.)
Woodwardia. Three species.
W. angustifolia, Smith. (W. areolata.) * (Eng. 1812.)
W. radicans, Smith. Gill. 1881.
W. Virginica, Smith. * (Eng. 1774.)

OPHIOGLOSSACEÆ, ADDER'S-TONGUE FAMILY.

Botrychium. A half dozen species in our territory.
B. lanceolatum, Ang. Gill. 1881.
B. matricariæfolium. A. Br. Gill. 1881.
B. simplex, Hitch. Gill. 1881.
B. ternatum, Swz. Gill. 1881.
B. ternatum var. australe, Eaton. Gill. 1881.
B. ternatum var. dissectum, Milde. Gill. 1881.
B. ternatum var. intermedium, Eaton. Gill. 1881.
B. Ternatum var. lunarioides, Milde. Kelsey '90-'91.
B. ternatum var. obliquum, Milde. Gill. 1881.
B. Virginianum, Swz. Gill. 1881. (Eng. 1790.)
Ophioglossum. There are 4 species in our region.
O. crotalophoroides, Walt. (O. bulbosum.) (Eng.)
O. vulgatum, Linn. Gill. 1881.

LYCOPODIACEÆ, CLUB-MOSS FAMILY.

Lycopodium. We have a dozen species.
L. annotinum, Linn. Hors. 1889.
L. clavatum, Linn. Gill. 1884.
L. complanatum, Linn. Hors. 1889.
L. lucidulum, Michx. Gill. 1884.
L. obscurum, Linn., var. dendroideum, Eaton. (L. dendroideum.) Gill. 1884. (Eng.)
L. Selago, Linn. Hors. 1889.

SELAGINELLACEÆ, SELAGINELLA FAMILY.

Selaginella. We have 8 species.
S. apus, Spring. Wool. 1883. (Eng.)
S. cuspidata, Link. *

S. Douglasii, Spring. Gill. 1881.
S. lepidophylla, Spring. *
S. Ludoviciana, A. Br. (Eng.)
S. pilifera, A. Br. (Eng.) A Mexican species, said by Baker to have been found in Texas.
S. rupestris, Spring. Gill. 1881.

SALVINIACEÆ.
Azolla Caroliana, Willd. *

MARCHANTIACEÆ, LIVERWORT FAMILY.
Marchantia. A single species in our region.
M. polymorpha, Linn. Gill. 1884.

§ 3. *Plant Portraits of 1891.*

A List of the Illustrations in Leading Horticultural and some Agricultural Journals and in the Experiment Station Publications, that are of such Character as to Aid in the Determination of the Species or Variety.

Abbreviations.—*Am. Agr.*, American Agriculturist; *Am. Farm & Hort.*, American Farm and Horticulturist; *Am. Flor.*, American Florist; *Am. Gar.*, American Garden; *Bot. Mag.*, Botanical Magazine; *Cal. Frt. Gr.*, California Fruit Grower; *Can. Hort.*, Canadian Horticulturist; *Farm & Vineyard*; *Fla. Dis.*, Florida Dispatch Farmer and Fruit Grower; *Ga.*, Georgia Agricultural Experiment Station; *Gar. & For.*, Garden and Forest; *Gar. Chron.*, Gardeners' Chronicle; *Gar. Mag.*, Gardener's Magazine; *Gar. World*, Gardening World; *Gart.*, Gartenflora; *Hort. Belge*, Revue de l'Horticulture Belge et Etrangére; *Hort. Art Jour.*, Horticultural Art Journal; *Ill. Hort.*, L'Illustration Horticole; *Jard.*, Le Jardin; *Jour. Hort.*, Journal of Horticulture; *Jour. Roses*, Journal des Roses; *L'Orch.*, L'Orchidophile; *Meehan's Monthly*; *N. Y. Cornell*, Bulletin Cornell Agricultural Experiment Station; *N. Y. State*, New York State Agricultural Experiment Station; *Ohio*, Ohio Agricultural Experiment Station; *Orch. & Gar.*, Orchard and Garden; *Ore.*, Oregon Agricultural Experiment Station; *Pop. Gar.*, Popular Gardening; *Prakt. Rat.*, Der praktische Ratgeber im Obst und Gartenbau; *Rev. Hort.*, Revue Horticole; *Rosen Zeit.*, Rosen-Zeitung; *Rural N. Y.*, Rural New-Yorker; *Vick's Mag.*, Vick's Magazine; *Woods.*, Woodsman.

C., colored plate.

(2), refers to the second volume, in such periodicals as run into two volumes during the year.

In all cases, the nomenclature is that which accompanies the illustrations.

Abies Canadensis pendula, Garden 81.
— lasiocarpa, Gar. & For. 380.
Abies magnifica, var. Shastensis, Gar. Chron. 429. (2)
— nobilis, Gar. Chron. 463. (2.)

Abies Nordmanniana, Gar. Chron. 461. (2.)
— religiosa, Gar. Chron. 305, 307.
— Smithiana, Garden 72.
— Webbiana, Gar. Chron. 393,-395,399. (2.)
Abronia umbellata, Am. Gar. 736; Gar. World 829.
Abutilon vexillarium, Garden 293. (2.)
— virginalis, Gart. 74.
Acacia dealbata, Prakt. Rat. 81.
— elongata, Gar. Chron. 43.
— Rose, Am. Gar. 739.
Acantholemon glumaceum, Rev. Hort. 489.
Acanthus latifolius, Garden 274. (2).
Acer barbatum (?) var. nigrum, Gar. & For. 149.
— insigne, var. velutinum, Gar. Chron. 189. (2.)
— saccharinum, Gar. & For. 141; Vick's Mag. 121.
— Trautvetteri, Gart. 264, 265, 266.
— Volxemi, Gar. Chron. 9, 11. (2).
Achimenes, Am. Agr. 441.
— Rosy Queen, Jour. Hort. 17.
Aconite, Winter, Am. Agr. 209.
Aconitum lycoctonum, Gar. Mag. 124.
Acrostichum osmundaceum, Hort. Belge 269.
Actinidia polygama, Am. Gar. 147.
— volubilis, Am. Gar. 143.
Adiantum cuneatum, Garden 362. (2.)
— gracillimum, Garden 131. (2.)
— Peruvianum, Gar. Chron. 397.
— princeps, Jard. 183.
— Williamsi, Orch. & Gar. 201.
Adonis Pyrenaica, Garden 269.
— vernalis, Garden 268. C.
Aëranthus brachycentron, Gart. 324.
— grandiflora, Am. Flor. 631.
Aërides affine var. Godefroijæ, Hort. Belge, 169. C.
— — — Lobbii, Hort. Belge, 171.
— — — Houlletianum majus, Rev. Hort. 324. C.
Æsculus Californica, Gar. & For. 523.
— Hippocastanum, Gar. World 377.
Aganisia cyanea Am. Flor. 631.
— tricolor, Am. Flor. 631.
Agapanthus umbellatus, Prakt. Rat. 389.
Agaricus melleus, Gar. Chron. 332.
Agave albicans, Bot. Mag. t. 7207. C.
— Americana, Garden 12.
Ageratum nanum, Vergissmeinnicht, Gart. 74.
— Wendlandi compactum nanum, Rev. Hort. 326.
Akebi, Am. Gar. 145, 151.
Akebia lobata, Am. Gar. 129. C.
— quinata, Am. Gar. 145, 151; Gar. &. For. 137.
Alder, Black, Can. Hort. 53.
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Rehmannia (Trionophora) rupestris, Bot. Mag. t. 7191. C.
Restrepia antennifera, Am. Flor. 631.
Rhamnus Purshiana, Am. Gar. 247. (An error. The cut is a Streptopus.)
Rhapis flabelliformis, Prakt. Rat. 428.
— humilis, Am. Flor. 405. (2.)
Rhazya orientalis, Gart. 225. C.
Rhipsalis dissimilis, Gart. 634.
— trigona, Gart. 39, 40.
Rhodanthe Manglesi, Hort. Belge 245.
— — maculata, Gar. World 617.

Rhododendron arboreum, Gar. Chron. 641.
- — Brookeanum, Gar. Chron. 621.
- — Championæ, Jour. Hort. 555. (2.)
- — Comtesse de Bari, Rev. Hort. 132. C.
- — Countess of Haddington, Garden 71. (2.)
- — Exoniense, Garden 466.
- — Ponticum, Gar. Chron. 465.
- — scabrifolium, Bot. Mag. t. 7159. C.
- — Veitchianum, Garden 463.
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Rhynchostylis cælestis, Gar. World 685.

Ribes alpinum, Gart. 342.
- — Grossularia, Gart. 342.
- — nigrum, Gart. 344.
- — rubrum, Gart. 342.
- — speciosum, Gart. 342.

Richardia Æthiopica (Little Gem), Garden 189.
- — Africana compacta, Gar. World 209. (2.)

Robinia Pseudacacia, Vick's Mag. 123.

Rock-rose, Laurel-leaved, Gar. Mag. 95.

Rodriguezia anomala, Gar. Chron. 729.

Romneya Coulteri, Gart. 593. C.

Rondeletia speciosa, Rev. Hort. 522. C.

Roridula dentata, Gar. Chron. 367. (2.)

Rosa Banksiæ, Bot. Mag. t. 7171, C.; Gar. Mag. 402.
- — gigantea, Gar. Mag. 402.
- — microphylla, Gar. Mag. 402.
- — multiflora, Am. Flor. 1003; Gar. & For. 535.
- — polyantha remontant, Prakt. Rat. 316, 317.
- — Wichuraiana, Gar. & For. 569.

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- — Alphonse Soupert, Rosen-Zeit. 49. C.
- — Anna Olivier, Garden 98. C.

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- — Baroness Rothschild, Garden 47. (2.)
- — Catherine Mermet, Am. Flor. 839.
- — Chestnut hybrid, Garden, 149.
- — Chinese, Garden 216. C.
- — Clothilde Soupert, Vick's Mag. 177. C.
- — Comtesse Anna Thun, Rosen-Zeit. 33. C.
- — Comtesse de Nadaillac, Gar. Mag. 401.
- — Dinsmore, Hort. Art Jour. 41. C.
- — Docteur Grill, Jour. Roses 42. C.
- — Duke of Teck, Rosen-Zeit. 85. C.
- — Edouard Morren, Gar. Mag. 395.
- — Gloire de Dijon, Hort. Belge 228. C.
- — Gloire des Polyantha. Jour. Roses 56. C.
- — Green, Am. Gar. 181.
- — Gustave Piganeau, Jour. Hort. 25. (2.)
- — Jean Libaud, Hort. Art Jour. 41. C.
- — Jules Lemaitre, Jour. Roses 8. C.
- — Kaiserin Auguste Viktoria, Rosen-Zeit. 17. C.
- — La France de '89, Jour. Roses 24, C.; Rev. Hort. 12.
- — Lamarque, Garden. & For. 233.
- — Laurette Messimy, Garden 378. (2.) C.
- — Le Vésuve, Jour. Roses 72. C.
- — Madame Baron-Veillard, Jour. Roses 104. C.
- — Madame Caroline Testout, Jour. Roses 136. C.
- — Madame de Watteville, Am. Flor. 841.
- — Madame Georges Bruant, Hort. Art Jour. 30; Am. Gar. 755.
- — Madame Joseph Bonnaire, Jour. Roses 152. C.

Rose, Madame Lambard, Garden 320. (2.)
— Madame Pierre Cochet, Jour. Roses 168. C.
— Marie Van Houtte, Garden 548. (2.)
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— Mrs. Paul, Jour. Hort. 367.
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— Prince A. de Wagram, Jour. Roses 177. C.
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— — var. variegata, Pop. Gar. 152.
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— — nana, Hort. Belge 38.
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— filifera, Bot. Mag. t. 7197. C.
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    Sec., Frank Boykin, Seale.

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    Pres., J. Van Lindley, Pomona, N. C.
    Sec., Chas. A. Green, Rochester, N. Y.

American Carnation Society:
    Pres., Edwin Lonsdale, Chestnut Hill, Phila.
    Sec., C. J. Pennock, Kennett Square, Chester Co., Pa.

American Chrysanthemum Society:
    Pres., John Thorpe, Pearl River, N. Y.
    Sec., Edwin Lonsdale, Chestnut Hill, Philadelphia.

American Cranberry Growers' Association:
    Pres., J. H. Brakeley. Bordentown, N. J.
    Sec., and Treas., A. J. Rider, Trenton, N. J.

American Forestry Association:
    Pres., James A. Beaver, Bellefonte, Pa.
    Sec., C. C. Birmey, Philadelphia, Pa.

American Horticultural Society:
    Pres., Parker Earle, Ocean Springs, Miss.
    Sec., E. A. Popenoe, Manhattan, Kan.

American Pomological Society:
    Pres., P. J. Berckmans, Augusta, Ga.
    Sec., G. C. Brackett, Lawrence, Kan.

American Seed Trade Association:
    Pres., F. Barteldes, Lawrence, Kan.
    Sec. and Treas., A. L. Don, New York.

Arizona Fruit Growers' Association:
    Pres., Dr. A. J. Chandler.
    Sec., H. R. Patrick, Phœnix.

Arkansas Horticultural Society:
    Pres., D. L. McLeod, Judsonia.
    Sec., W. K. Tipton, Little Rock.

Association of American Cemetery Superintendents :
Pres., John G. Barker, Jamaica Plain, Mass.
Sec., Frank Higgins, Detroit, Mich.

British Columbia Fruit Growers' Association :
Pres., W. J. Harris, Port Hammond.
Sec., A. H. B. MacGowan, Vancouver.

CALIFORNIA—

California Board of Viticultural Commissioners.
Pres., J. De Barth Shorb, San Gabriel.
Sec., Winfield Scott, San Francisco.

California Fruit Union :
Pres., J. Z. Anderson, San Francisco.
V.-Pres. and Sec., L. W. Buck, San Francisco.

California Horticultural Society :
Pres., E. W. Hilgard, Berkeley.
Sec., E. J. Wickson, Berkeley.

California State Board of Horticulture :
Pres., Ellwood Cooper, Santa Barbara.
Sec., B. M. Lelong, San Francisco.

California State Floral Society :
Pres., E. J. Wickson, Berkeley.
Sec., Emory E. Smith, San Francisco.

Fruit Association :
Pres., James A. Webster, Vacaville.
Sec., T. H. Buckingham, Vacaville.

Pomological Society of Southern California :
Pres., Hiram Hamilton, Orange.
Sec., D. Edson Smith, Santa Ana.

Cider Makers' Association of the Northwest.
Pres., G. W. Hilliard, Brighton, Ill.
Sec., L. R. Bryant, Princeton, Ill.

Colorado Horticultural Society :
Pres., C. S. Faurot, Boulder.
Sec., Alexander Shaw, Denver.

Connecticut. No State Society.

Delaware. No State Society. See Peninsula Hort. Soc.

Eastern Nurserymen's Association :
Pres., W. C. Barry, Rochester, N. Y.
Sec., William Pitkin, Rochester, N. Y.

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Florida Fruit Exchange :
Pres., Geo. R. Fairbanks, Jacksonville.
Sec., M. P. Turner, Jacksonville.

Florida Horticultural Society:
Pres., Dudley W. Adams, Tangierine.
Sec., E. O. Painter, De Land.

Florida Orange Growers' Union:
Pres., J. C. McKibbin, Pomona.
Sec., A. H. Manville, Palatka.

Foreign Fruit Exchange:
Pres., D. Wegman, New York City.
Sec., F. S. Robinson, New York City.

Georgia Horticultural Society:
Pres., P. J. Berckmans, Augusta.
Sec., T. L. Kinsey, Savannah.

Illinois Horticultural Society:
Pres., Jabez Webster, Centralia.
Sec., A. C. Hammond, Warsaw.

INDIANA—

Indiana Horticultural Society:
Pres., E. J. Howland, Howland.
Sec., W. H. Ragan, Greencastle.

Society of Indiana Florists:
Pres., Frederick Dorner, Lafayette.
Sec., Wm. G. Bertermann, Indianapolis.

Inter-State Shippers' Association:
Pres., A. M. DuBois, Cobden, Ill.
Sec., Thomas Buckle, Villa Ridge, Ill.

Iowa Horticultural Society:
Pres., Eugene Secor, Forest City.
Sec., Geo. Van Houten, Lenox.

Kansas Horticultural Society:
Pres., L. Houk, Hutchinson.
Sec., G. C. Brackett, Lawrence.

Kentucky Horticultural Society:
Pres., A. P. Farnsley, Louisville.
Sec., John C. Hawes, Louisville.

Louisiana. No State Society.

Maine State Pomological Society:
Pres., Chas. S. Pope, Manchester.
Sec., D. H. Knowlton, Farmington.

Massachusetts Horticultural Society:
Pres., William H. Spooner, Jamaica Plain.
Sec., Robert Manning, Boston.

Michigan Horticultural Society:
Pres., T. T. Lyon, South Haven.
Sec., Edwy C. Reid, Allegan.

MINNESOTA—

Minnesota Horticultural Society:
Pres., Wyman Elliot, Minneapolis.
Sec., A. W. Latham.

Society of Minnesota Florists:
Pres., E. Nagel, Minneapolis.
Sec., R. Wessling, Minneapolis.

Mississippi Horticultural Society:
Pres., H. E. McKay, Madison Station.
Sec., W. H. Cassell, Canton.

Missouri Horticultural Society:
Pres., J. C. Evans, Harlem.
Sec., L. A. Goodman, Westport.

Montana. No Society.

Montreal Horticultural Society:
Pres., F. Roy, Montreal.
Sec., W. W. Dunlop, Montreal.

Nebraska Horticultural Society:
Pres., F. W. Taylor, Lincoln.
Sec., G. J. Carpenter, Fairbury.

Nevada. No Society.

New Hampshire. No Society.

New Jersey Horticultural Society:
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Sec., Wm. R. Ward, Newark.

New Mexico Horticultural Society:
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Sec., Geo. H. Cross, Santa Fé.

NEW YORK—

New York Horicultural Society. Non-active.

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Pres., W. C. Barry, Rochester.
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North Carolina Horticultural Society:
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North Dakota. No Society.

Nova Scotia Fruit Growers' Society:
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Sec., C. R. H. Starr, Wolfville.

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Ontario Fruit Growers' Association:
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Oregon Horticultural Society:
Pres., J. R. Cardwell, Portland.
Sec., E. R. Lake, Portland,

Oregon Pomological Society:
Pres., E. P. Roberts, The Dalles.
Sec., J. A. Varney, The Dalles.

Oregon State Board of Horticulture:
Pres., J. R. Cardwell, Portland.
Sec., Ethan W. Allen, Portland.

Peninsular Horticultural Society:
Pres., E. L. Martin, Seaford, Del.
Sec., Wesley Webb, Dover, Del.

PENNSYLVANIA—

Pennsylvania Horticultural Society:
Pres., G. W. Childs, Philadelphia.
Sec., D. D. L. Farson, Philadelphia.

Pennsylvania State Horticultural Association:
Pres., W. H. Moon, Morrisville.
Sec., E. B. Engle, Waynesboro.

Rhode Island Horticultural Society.
Pres., John G. Massie, Providence.
Sec., Chas. W. Smith, Providence.

Society of American Florists:
Pres., James Dean, Bay Ridge, N. Y.
Sec. W. J. Stewart, Boston, Mass.

South Carolina Horticultural Society:
Pres., H. B. Buist, Greenville.
Sec., G. Wanner, Walhalla.

South Dakota Horticultural Society:
Pres., H. C. Warner, Forestburg.
Sec., C. A. Keffer, Brookings.

Tennessee—West Tennessee Horticultural Society:
Pres., J. C. Tharp, Gibson.
Sec., A. A. Cawdery, Gadsden.

TEXAS—

Texas State Horticultural Society:
Pres., John M. Howell, Dallas.
Sec., D. H. Watson, Brenham.

Texas State Nurserymen's Association:
Pres., E. W. Kirkpatrick, McKinney.
Sec., J. M. Howell, Dallas.

Utah. No Society.

Vermont. No Society.

Virginia Pomological Society. Non-active.

WASHINGTON—

State Board of Horticulture:
Pres., Henry Bucey, Tacoma.
Sec., C. A. Tonneson, Tacoma.

Washington Horticultural Society:
Pres., Henry Bucey, Tacoma.
Sec., A. N. Miller, Puyallup.

West Virginia. No Society.

Western Nurserymen's Association:
Pres., G. J. Carpenter, Fairbury, Neb.
Sec., J. W. Schoette, St. Louis, Mo.

Wisconsin Horticultural Society:
Pres., M. A. Thayer, Sparta.
Sec., B. S. Hoxie, Evansville.

Wyoming. No Society.

§ 5. *Directory of Horticulturists, or Those in Charge of Horticultural Work, of Experiment Stations in North America.*

Alabama :
  P. H. Mell, M.E., Ph.D., Auburn, Botanist and Meteorologist.
  Geo. F. Atkinson, Ph.D., Auburn, Biologist.
Arizona :
  E. L. Benton, Tucson, Horticulturist.
Arkansas :
  J. F. McKay, Fayetteville, Horticulturist.
California :
  E. J. Wickson, A.M., Berkely, Supt. of Grounds.
Canada (Agricultural College):
  J. Hoyes Panton, Guelph, Botanist.
Canada (Central Experimental Farm) :
  John Craig, Ottawa, Horticulturist.
Colorado :
  C. S. Crandall, M.S., Fort Collins, Botanist and Horticulturist.
Connecticut (State Station) :
  W. C. Sturgis, Ph.D., New Haven, Mycologist.
Delaware :
  M. H. Beckwith, Newark, Horticulturist and Entomologist.
Florida :
  J. P. de Pass, Lake City, Director.
Georgia :
  Gustave Speth, Experiment, Horticulturist.
Illinois :
  Thomas J. Burrill, Ph.D., Champaign, Horticulturist and Botanist.
Indiana :
  James Troop, M.S., LaFayette, Horticulturist.
Iowa :
  J. L. Budd, M.H., Ames, Horticulturist.

Kansas :
Edward A. Popenoe, A.M., Manhattan, Horticulturist.

Kentucky :
C. W. Mathews, Lexington, Botanist and Horticulturist.

Louisiana :
H. A. Morgan, B.S , Baton Rouge, Entomologist and Horticulturist.

Maine :
W. M. Munson, B.S., Orono, Horticulturist.

Maryland :
Thomas L. Brunk, B.S., College Park, Horticulturist.

Massachusetts (Hatch Station) :
Samuel T. Maynard, B. S., Amherst, Horticulturist.

Michigan :
L. R. Taft, M.S., Agricultural College P. O., Horticulturist.

Minnesota :
Samuel B. Green, B.S., St. Anthony Park, Horticulturist.

Mississippi :
A. B. McKay, B.S., Agricultural College P. O., Horticulturist.

Missouri :
Charles Keffer, Columbia, Horticulturist.

Nebraska :
Frederic W. Taylor, Lincoln, Horticulturist.

Nevada :
R. H. McDowell, B.S., Reno, Agriculturist and Horticulturist.

New Hampshire :
G. H. Whitcher, B.S., Hanover, Director.

New Jersey :
Byron D. Halstead, Sc.D., New Brunswick, Botanist and Horticulturist.

New Mexico :
A. E. Blount, A.M., Las Cruces, Agriculturist and Horticulturist.

New York (Cornell) :
L. H. Bailey, M.S., Ithaca, Horticulturist.

New York (State) :
S. A. Beach, B.S., Botanist and Horticulturist.
C. E. Hunn, Geneva, Assistant.
George W. Churchill, Geneva, Assistant.

North Carolina :
W. F. Massey, C.E., Raleigh, Horticulturist.

North Dakota :
C. B. Waldron, B.S., Fargo, Arboriculturist.

Oklahoma :
A. C. Magruder, Stillwater, Agriculturist and Horticulturist.
Oregon :
George Coote, Corvallis, Horticulturist.
Pennsylvania :
George C. Butz, M.S., State College, Centre Co., Horticulturist.
Rhode Island :
L. F. Kinney, B.S., Kingston, Horticulturist.
South Carolina :
J. S. Newman, Fort Hill, Director.
South Dakota :
L. Foster, M.S., Brookings, Director.
Tennessee :
R. L. Watts, B.Ag., Knoxville, Horticulturist.
Texas :
G. W. Curtis, M.S., College Station, Director.
Utah :
E. S. Richmond, B.S., Logan, Horticulturist and Entomologist.
Vermont :
B. W. Minott, B.S., Burlington, Horticulturist.
Virginia :
W. B. Alwood, Blacksburg, Botanist and Entomologist.
Washington :
E. R. Lake, M.S., Pullman, Botanist and Horticulturist.
West Virginia :
Charles F. Millspaugh, M.D., Morgantown, Botanist and Microscopist.
Wisconsin :
Emmett S. Goff, Madison, Horticulturist.
Wyoming :
B. C. Buffum, B.S. Horticulturist.

§ 6. *The Botanic Gardens of the World (with corrections to the close of 1891 by Professor D. P. Penhellaw.)*

Algeria—1.
Algiers, Jardin d'Acclimation du Hamma, Charles Rivière, Director.

Australia—4.
Adelaide (South Australia), Maurice Holtze, Director.
Brisbane (Queensland), Philip MacMahon, Director.
Melbourne (Victoria), Dr. W. K. Guilfoyle, Director.
Sidney (New South Wales), Charles Moore, F.L.S., Director.

Austro-Hungary—15.
Brunn, Botanic Gardens, Prof. Alex. Makovsky, Director.
Budapest (Hungary), University Botanic Garden, Dr. L. Juranyi, Director.
Czernowitz (Bukovina), University Botanic Garden, Dr. Ed. Tangl, Dir.
Gratz (Styria), University Botanic Garden, Dr. G. Haberlandt, Dir.
Innsbruck (Tyrol), University Botanic Garden, Dr. Emil Heinricher, Director.
Klagenfurt (Carinthia), Baron Marcus V. Jabornegg-Gamsenegg, Dir.
Kolozsvar (Transylvania), Royal Botanic Garden, Dr. Aug. Kanitz, Dir.
Krakau (Galicia), University Botanic Garden, Dr. Jos. Thom, De Rostafinski, Director.
Lemberg (Galicia), University Botanic Garden, Dr. Th. Ciesieski, Dir.
Prague (Bohemia), University Botanic Garden, Dr. M. Willkomm, Dir.
Schemnitz (Hungary), Prof. Ludwig Fekete, Director.
" " Forestry Acad. Botanic Garden, R. Ling, Dir.
Trieste (Istria), Raimondo Tominz, Director.
Vienna, University Botanic Garden, Dr. A. J. Kerner, Director.
Vienna, Imperial Horticultural Gardens of Hofburg, Fr. Antoine, Dir.

Belgium—5.
Antwerp, Dr. H. Van Heurck, Director.
Brussels, Royal Botanic Gardens, Francois Crépin, Director.
Ghent, University Botanic Garden, Dr. J. MacLeod, Director.
Gembloux, Botanic Garden of the Agricultural Institute, Em. Laurent, Director.
Liege, University Botanic Garden, Dr. A. Gravais, Director.

Brazil—1.

Rio de Janeiro, Government Botanic Gardens, Dr. J. B. Rodrigues, Director.

Canada—1.

Montreal (P. Q.), McGill University Botanic Garden, Prof. D. P. Penhallow, Director.

Canary Islands—1.

Orotava (Teneriffe), Jardin d'Acclimatation, Mr. Wildpret, Chief Gardener.

Cape of Good Hope—3.

Cape Town, Prof. MacOwan, Director.
Graaf Reinet, J. C. Smith, Chief of the Garden.
Graham's Town, Edward Tidmarsh, Chief of the Garden.

Ceylon—1.

Peradeniya, Royal Botanic Garden, Dr. Henry Trimen, Director.

Chili—1.

Santiago, Prof. Fred. Philippi (fils), Director.

China—1.

Hong Kong, Government Botanic Gardens, A. B. Westland, Supt.

Cochin China—1.

Saigon, Colonial Botanic Gardens, Dr. Regnier, Director.

Denmark—2.

Copenhagen, University Botanic Gardens, Prof. Eug. Warming, Dir.
Copenhagen, Royal Gardens of Rosenborg, Mr. Paludin, Director.

Ecuador—1.

Quito, Prof. R. P. Al Sodiro, Director.

Egypt—1.

Cairo, Prof. E. Sickenberger, Director.

France—22.

Angers, Dr. Em. Lieutaud, Director.
Besancon, Dr. Ant. Magnin, Director.
Caen, Otto Lignier, Director.
Cannes, Comte d'Emprémesnil, Director.
Clermont-Ferrand, M. Langè, Chef des Culture.
Dijon, Dr. Laguesse, Director.
Hyeres, Emile Davrillon, Director.
Lille, T. Meurein, Director.
Lyon, Civic Botanic Garden, Prof. Gerard, Director.
  " Botanic Garden of the Faculty of Medicine, Dr. C. Beauvisage, Director.
  " Botanic Garden of the Veterinary School, Prof. Faure, Director.
Montpellier, Prof. M. Granel, Director.
Nancy, Prof. G. Le Monnier, Director.
Nantes, Dr. Ecorchard, Director.

Orleans, M. Rossignol, Director.

Paris, Gardens of the Natural History Museum, Prof. Maxime Cornu, Director.

Rochefort, Dr. Barallier, Director.

Rouen, Emm. Blanche, Director.

St. Quentin, Charles Magnier, Director.

Toulon, J. B. Chaubaud, Chief Gardener.

Toulouse, Prof. Leclere du Sablon, Director.

Tours, Prof. David Barnsby, Director.

Germany—35.

Aix-la-Chapelle, Botanic Gardens, Dr. A. Förster, Director.

Bamberg (Bavaria) Dr. Funk, Director.

Berlin, Royal Botanic Gardens, Prof. A Engler, Director.

Berlin, University Botanic Gardens, Dr. S. Schwendener, Director.

Bonn (Rhenish Prussia), University Botanic Gardens, Dr. Ed. Strasburger, Director.

Breslau (Silesia), University Botanic Gardens, Dr. K. Prantl, Director.

Brunswick (Brunswick), Botanic Garden of the Polytechnic School, Dr. W. Blasius, Director.

Carlsruhe (Baden), J. Pfister, Director.

Cologne (Rhenish Prussia), Prof. J. Niepraschk, Director.

Darmstadt (Hesse), Botanic Garden of the Polytechnic School, Dr. Leopold Dippel, Director.

Dresden (Saxony), Royal Botanic Garden, Dr. Oscar Drade, Director.

Erlangen (Bavaria), University Botanic Garden, Dr. Max. Rees, Dir.

Frankfort-on-Main (Hesse-Nassau), Botanic Garden of the Medical Institute, ———, Director.

Freiburg (Baden), University Botanic Garden, Dr. F. Hildebrand, Dir.

Giessen (Hesse), University Botanic Garden, Prof. A. Hansen, Dir.

Görlitz (Silesia), Dr. R. Peck, Director.

Göttingen, University Botanic Garden, Dr. Peter, Director.

Greifswald (Pomerania), University Botanic Garden, Dr. Fr. Schmitz, Director.

Halle-upon-Salle (Saxony), University Botanic Garden, Dr. Greg. Kraus, Director.

Hambnrg, Dr. Sadebeck, Director.

Heidelberg (Baden), University Botanic Garden, Dr. E. Pfitzer, Dir.

Jena (Saxe-Weimar), University Botanic Garden, Dr. E. Stahl, Dir.

Kiel (Schleswig-Holstein), University Botanic Garden, Prof. J. Reinke, Director.

Königsberg, University Botanic Garden, Dr. Christ. Luerrsen, Dir.

Leipzig (Saxony), University Botanic Garden, Dr. W. Pfeffer, Dir.

Marbourg (Hesse-Nassau), University Botanic Gardens, ———— Director.

Munden (Hanover), Forestry Botanic Garden, N. F. C. Müller, Dir.

Munich (Bavaria). Dr. K. Goebel, Director.

Munster (Westphalia), Botanic Garden of the Academy, Dr. O. Brefeld, Director.

Potsdam, Dr. Juhlke, Director.

Rostock (Mecklenburg), University Botanic Garden, Dr. P. Falkenberg Director.
Strasburg (Alsace-Lorraine), University Botanic Garden, Comte Herm. de Solms-Laubach, Director.
Tharand (Saxony), Forestry Academy Garden, Dr. Fred, Nobbe, Dir.
Tubingen (Wurtemberg), University Botanic Garden, ——— Director.
Wurzberg (Bavaria), University Botanic Garden, Dr. Jul. von Sachs, Director.

Great Britain and Ireland—11.

Birmingham (England), Mr. Latham, Director.
Cambridge (England), University Botanic Garden, Dr. Francis Darwin, Sec. to the Garden Synd.
London (England), Royal Gardens, Kew, Prof. W. T. Thistelton-Dyer, Director.
London (England), Royal Botanic Gardens, Regent's Park, W. Coomber, Superintendent.
London (England), Royal Horticultural Society Gardens, South Kensington, A. F. Barron, Superintendent.
Manchester (England), Bruce Findlay, Curator.
Oxford (England), University Botanic Garden, Dr. S. H. Vines, Dir.
Dublin (Ireland), Royal Botanic Gardens of Glasnevin, F. W. Moore, Curator.
Belfast (Ireland), Royal Belfast Botanic Gardens, R. Motherell, Sec'y.
Edinburgh (Scotland), Royal Botanic Gardens, Dr. I. Bayley Balfour, Director.
Glasgow (Scotland), R. Bullen, Curator.

Greece—1.

Athens, Dr. T. de Heldreich, Director.

Guatemala—1.

Guatemala, Dr. Francesco Abella, Director.

Guiana—1.

Georgetown, G. S. Jenman, Superintendent.

Holland—4.

Amsterdam, Prof. Dr. C. A. J. A. Oudemans, Director.
Groningen, Prof. Dr. J. W. Moll, Director.
Leyden, Prof. Dr. W. F. R. Suringar, Director.
Utrecht, Prof. Dr. N. W. P. Rauwenhoff, Director.

Indian Empire—9.

Agras (N. W. Provinces), Taj Gardens, A. B. Westland, Supt.
Bangalore (Madras), Col. W. L. Johnson, Director.
Bombay, S. Carstenson, Supt.
Calcutta, Royal Botanic Gardens, Prof. G. King, Director.
Ganish Kind (Poona), ———, Director.
Mysore, Government Botanic Gardens, ———, Director.
Ootacamud, Mr. M. A. Lanen, Director
Pondichery.
Sacharanpur and Mussourie (Bengal), Government Botanic Gardens, W. Gollan, Supt. J. F. Duthie, Dir. Bot. Dept. of Northern India.

Italy—22.

Bologne, Prof. F. Delpino, Director.
Cagliari, Prof. P. Gennari, Director.
Catania, Prof. Fr. Tornabene, Director.
Ferrara, Prof. Charus Massalongo, Director.
Florence, Prof. T. Caruel, Director.
Genoa, Prof. Otto Penzig, Director.
Lucca, Dr. C. Bicchi, Director.
Messina, Prof. A. Borzi, Director.
Milan, Prof. Fr. Ardissone, Director.
Modena, Prof. A. Mori, Director.
Naples, Prof. J. A. Pasquale, Director.
Podova, Prof. P. A. Saccardo, Director.
Palermo, Dr. Ag. Todaro, Director.
Parma, Prof. J. Passerini, Director.
Pavia, Prof. J. Briosi, Director.
Perugia, Prof. Al. Bruschi, Director.
Pisa, Prof. J. Arcangeli, Director.
Portici, Prof. Horace Comes, Director.
Rome, Prof. R. Pirrotta, Director.
Siena, Prof. Att. Tassi, Director.
Turin, Prof. G. Gibelli, Director.
Venice, Sen. Ruchiner, Director.

Japan—2.

Tokio, Botanic Garden of the Imperial University, Z. Matsumoura, Director.
Sapporo, Government Botanic Gardens, Dr. K. Miyabe, Director.

Java—1.

Buitenzorg, Dr. M. Treub, Director.

Malta—1.

Floriana, Argotti Gardens, Prof. F. Debono, M. D. Director.

Mauritius—1.

Port Louis, J. Horne, Director.

Natal—1.

D'Urban, Natal Botanic Gardens, J. Medley Wood, Curator.

New Zealand—3.

Christchurch, A. L. Taylor, Director.
Dunedin, J. McBean, Director.
Wellington, Colonial Botanic Garden, Sir James Hector K.C.M.G., Director.

Peru—1.

Lima, Dr. Mig. de los Rios, Director.

Philippine Islands—1.

Manilla (Luzon), ———, Director.

Portugal—3.
Coimbra, Dr. J. A. Hienriques, Director.
Lisbon, Prof. Conde de Ficalho, Director.
Oporto, Dr. A. Goncalves, Director.

Reunion Island of—1.
St. Denis, M. Richard, Director.

Roumania—2.
Bucharest, Dr. Brandza, Director.
Yassy, Dr. A. Fêtu, Director.

Russia—14.
Dorpat (Livonia), Dr. Ed, Russow, Director.
Helsingfors (Finland), —— ——, Director.
Kazan (Kazan), Dr. N. W. Sorokin, Director.
Kharkoff, Prof. H. L. Reinhardt, Director.
Kiev, Dr. J. Schmalhausen, Director.
Moscow, Dr. J. Goroschankin, Director.
Nikita (Crimea), Mr. Basarow, Director.
Odessa, Dr. Rioschawi, Director.
Ouman (Kiev) Prof. Puchkawicz, Director.
St. Petersburg, Imperial Botanic Gardens, Dr. Ed. de Regel, Director.
St. Petersburg, University Botanic Gardens, Prof. André Beketow, Director.
St. Petersburg, Gardens of the Medical Academy, Prof. A. Batazin, Director.
Tiflis, H. Jacob Medwedew, Director.
Warsaw, H. W. Belajew, Director.

Scandinavia—6.
Christiania, (Norway) University Botanic Gardens, Dr. F. C. Schübeler, Director.
Göteborg (Sweden), Hort. Soc. Bot. Gardens, G. Löwegren, Director.
Lund (Sweden), University Botanic Gardens, Dr. F. W. C. Areschoug, Director.
Stockholm (Sweden), Garden of the Royal Academy of Agricultural Sciences, E. Lindgren, Director.
Stockholm (Sweden), Royal Gardens of Haga, M. A. Werner, Director.
Upsala (Sweden), University Botanic Garden, Dr. Th. M. Fries. Dir.

Servia—1.
Belgrade, Prof. St. Th. Yakchitch, Director.

Siberia—1.
Tomsk, University Botanic Gardens, Prof. Korshinsky, Director.

Spain—2.
Madrid, Dr. Miguel Colmeiro, Director.
Valencia, ————, Director.

Straits Settlements—1.
Singapore, H. N. Ridley, Director.

Switzerland—4.

Basle, Dr. Klebs, Director.
Berne, Dr. L. Fischer, Director.
Geneva, Dr. Mueller, Director.
Zurich, Dr. C. Craner, Director.

Tasmania—1.

Hobart Town, Mr. Abbot, Director.

United States—5.

Brookline (Mass.), Arnold Arboretum of Harvard College, Prof. C. S. Sargent, Director.
Cambridge (Mass.), Harvard College Botanic Gardens, Dr. G. L. Goodale, Director.
Lansing (Michigan), Botanic Garden of State Agricultural College, Dr. W. J. Beal, Director.
St. Louis (Missouri), Missouri Botanical Garden, Dr. Wm. Trelease, Director.
Washington (D. C.), U. S. Dept. of Agriculture Gardens, Wm. Saunders, Superintendent.

West Indies—6.

Havana (Cuba), J. Lachaume, Director.
Hope Gardens (Jamaica), Wm. Harris, Superintendent.
King's House (Jamaica), Wm. Thompson, Superintendent.
Kingston (Jamaica), Government Botanic Gardens, Wm. Fawcett, Dir.
Trinidad, Royal Botanic Gardens, J. H. Hart.
St. Pierre (Martinique), Colonial Botanic Gardens, E. Nolly, Dir.

§ 7. *Title Index to Experiment Station Horticultural Literature in North America for the year 1891, (including Publications of the Department of Agriculture).*

Explanation.—The figures in the left margin are the numbers of the reports and bulletins. If the figures stand alone, it indicates that the bulletin contains only horticultural matter; but if they stand in a parenthesis, the bulletin contains other matter than that which is indexed.

ALABAMA:

A. Agricultural Experiment Station.

28. Watermelons and Cantaloupes. Nov. *J. S. Newman* and *Jas. Clayton.*
29. Grapes, Raspberries and Strawberries. Nov. *J. S. Newman* and *Jas. Clayton.*
30. Apples, Pears, Peaches and Plums. Nov. *J. S. Newman.*
31. Irish and Sweet-Potatoes. Nov. *J. S. Newman* and *Jas. Clayton.*

B. Canebrake Experiment Station.

12. Grapes, Strawberries and Raspberries. Oct.

ARKANSAS:

(1889 report.) Potatoes. *A. E. Menke.* Report of Horticulturist [Strawberries, Sweet-Potatoes, Germination Tests and Experiments with Various Vegetables]. *E. S. Richmond* and *A. F. Cory.*

(1890 report.) Horticulturist's Report [Tomatoes, Cucumbers, Apples, Strawberries, Plums, Apricots, Grapes]. *Jerome McNeill.* Entomologist's Report [Experiments with Arsenites]. *C. W. Woodworth.* Newport Branch [Sweet-Potatoes]. *R. L. Bennett.*

CALIFORNIA:

(1888-89 report.) Report of the Year's Work in Horticulture at Central Experiment Station. Notes on Culture Experiments at Foothill and Southern Coast Range Station and San Joaquin Valley Station. Lists of Trees and Shrubs in University grounds, and list of Fruit-Trees and Graperies.

(1890 report.) Fruit and Vegetable Products. Investigation of California Oranges and Lemons. *G. E. Colby* and *H. L. Dyer.* Analysis of Apricots. Preservative Fluids for Fresh Fruits. *E. W. Hilgard.* The Sulphuring of Dried Fruits. *E. W. Hilgard.* Olive-Culture. *W. G. Klee, Louis Paparelli.* Reports from Miscellaneous Plants sent out from the Central Station. *Chas. H. Shinn.* Report of Horticultural work at Foothill Station, Southern Coast Range Station, San Joaquin Valley Station, and South California Station. *Chas. H. Shinn.* Spray and Band Treatment for Codlin-Moth. *C. W. Woodworth.* The use of Gases against Scale-Insects. *F. W. Morse.* Grapes from Italy and Persia. *L. Paparelli.* Distribution of Seeds and Plants. *E. J. Wickson.*

89. Distribution of Seeds and Plants. Dec. 1890. *E. J. Wickson.*
91. Port and Sherry Grapes in California. Importation of Italian Grapes. Importation of Olives. Feb. *E. J. Wickson.*
92. Notes on California Olives. March. *L. Paparelli.*
93. Investigation of California Oranges and Lemons. June. *Geo. E. Colby* and *H. L. Dyer.*
95. Distribution of Seeds and Plants. Dec. *E. J. Wickson.*

CANADA :

A. Agricultural College (*Guelph*).

(16th report.) Experiments with Potatoes.

LII. Black-Knot on Plums. *J. Hoyes Panton.*
LXII. Bark-Louse and Pear-Tree Slug. Apr. *J. Hoyes Panton.*
LXV. Ginseng. June. *J. Hoyes Panton.*

B. Central Experimental Farm (*Ottawa*).

10. Treatment of Apple-Scab, Grape and Gooseberry Mildew. April. *John Craig.*
11. Recommendations for the Prevention of Damage by some Common Insects. May. *James Fletcher.*

COLORADO :

(3d report.) Report of Botanist and Horticulturist [Brief Notes on many Varieties of Fruits and Vegetables]. *C. S. Crandall.*

15. The Codlin-Moth and the Grape-Vine Leaf-Hopper. April. *C. P. Gillette.*
17. A preliminary report on the Fruit Interests of the State. Oct. *C. S. Crandall.*

CONNECTICUT :

State Station. (*New Haven.*)

(1889 report.) Report of Mycologist [Fungous Diseases of the Onion. Bean-Mildew. Bordeaux Mixture]. *Roland Thaxter.*

(1890 report.) Report of Mycologist [Potato-Scab, Results from Application of Fungicides, etc.]. *Roland Thaxter.*

107. The Connecticut Species of Gymnosporangium [Cedar-Apples]. April. *Roland Thaxter.*
108. Ash Analysis of White Globe Onions.

DELAWARE:

(2d report.) Report of Botanist [Black Rot of Grape, Seed-Testing, Pear-Scab, Peach-Yellows]. *F. D. Chester.* Report of Horticulturist and Entomologist [Small Fruit Plats, Black Rot of Grapes. Insecticides]. *M. H. Beckwith.*

(3d report.) Fertilizer Experiments with Sweet-Potatoes, Peach Trees, Strawberries and Tomatoes. *A. T. Neale.* Experiments in the Treatment of Plant Diseases. *F. D. Chester.* Report of the Horticulturist, Including Lists of Fruits and Vegetables, and Experiments with Insecticides. *M. H. Beckwith.*

A. Special. Fungicides. *F. D. Chester.*

XI. Soil and Crop Tests [Corn, Sweet-Potatoes, Peach Trees, Strawberries, Tomatoes]. Jan. *A. T. Neale.*

XII. Injurious Insects and Insecticides [Peach-Aphis, Spring Canker-Worm, Rose-Chafer, Harlequin Cabbage-Bug, Cut-Worms, Angoumis Grain-Moth, and Black Flea-Beetle], March. *M. H. Beckwith.*

XIII. The Leaf-Blight of the Pear and Quince. July. *F. D. Chester.*

FLORIDA:

(13.) Irish Potatoes. April. *James P. DePass.*

(14.) Report of Dept. of Horticulture [Various Fruits and Vegetables]. *James P. DePass.* Notes on Insecticides. *J. J. Earle.* Ft. Myers Sub-Station [Pineapples]. *L. C. Washburn.* Formulas of Insecticides, etc. *James P. DePass.* July.

GEORGIA:

(11.) Culture Experiments and Variety Tests in Sweet-Potatoes, Garden Vegetables, etc. Jan. *Gustave Speth.*

(14.) Variety Tests and Fertilizer Experiments with Vegetables. Oct. *G. Speth.*

(15.) Culture of Small Fruits. *G. Speth.*

ILLINOIS:

(13.) Experiments with Sweet and Pop-Corn. Feb. *Thos. J. Burrill, Geo. W. McCluer,* and *G. E. Morrow.*

15. The Fruit Bark-Beetle. *S. A. Forbes.* Use of Fungicides upon the Apple, Potato and Grape. Feb. *T. J. Burrill* and *G. W. McCluer.*

INDIANA:

(34. Vol. II.) Experiments with Vegetables. Arsenite of Ammonia as an Insecticide. Feb. *James H. Troop.*

IOWA:

(12.) Experiments with Potatoes. *R. P. Speer.* Sugar-Beets. *G. E. Patrick* and *E. N. Eaton.* Injurious Insects and Insecticides. *C. P. Gillette.* Feb.

(13.) Treatment of Fungous Diseases. *L. H. Pammel.* Hardiness of Blossoms of Orchard Fruits. *J. L. Budd.* May.

(14.) Kerosene Emulsion for Plant-Lice. *Herbert Osborne* and *H. A. Gossard.* Breeding of the Orchard and Garden Fruits. Aug.

KANSAS.

(2d report.) Report of the Department of Horticulture and Entomology [Garden Tests of Vegetables. Some Insects Injurious to the Bean]. *E. A. Popenoe, S. C. Mason* and *F. A. Marlatt.*

17. Crossed Varieties of Corn, Second and Third Years. Dec. *W. A. Kellerman* and *W. T. Swingle.*

19. Germination of Weeviled Peas. Garden Notes on Potatoes, Beans and Cabbage. Dec., 1890. *E. A. Popenoe, S. C. Mason* and *F. A. Marlatt.*

26. Comparison of the Varieties of the Strawberry. Dec. *E. A. Popenoe* and *S. C. Mason.*

KENTUCKY:

32. Variety Tests of Strawberries and Vegetables [Peas]. March. *C. L. Curtis.*

33. Corn Experiments. April.

LOUISIANA:

8. Results of 1890. Orchard Fruits, etc. Jan. *J. G. Lee.*

MAINE:

(1890 report.) Report of Botanist and Entomologist [Germination Experiments. Spraying for Apple-Scab and Codlin-Moth and Potato-Beetle. Causes of Potato-Scab. Correspondence about Strawberries. White-Marked Tussock-Moth. Fall Web-Worm, Eye-Spotted Bud-Moth. Woolly Louse of the Apple. Red-Humped Apple-Tree Caterpillar. Forest Tent-Caterpillar. Fruit Tests]. *F. L. Harvey.*

MARYLAND:

(1890 report.) Report of Horticulturist [Tomatoes, Strawberries, Potatoes, Orchard, Nursery, Vineyard and Grape Culture. Orchard Fertilizer Test. Blackberry-Rust, and Vegetable Test]. *T. L. Brunk.*

11. Tomatoes. Dec. 1890. *W. H. Bishop* and *H. J. Patterson.*

MASSACHUSETTS:

A. State Experiment Station.

(8th report.) Analyses of Apples, Asparagus. *W. H. Beal.* Black Knot of Plums, Cucumber Mildew, Brown Rot of Stone-Fruits. Potato-Scab. Notes on Various Diseases. *James E. Humphrey.*

(39.) Treatment of Fungous Diseases. April. *J. E. Humphrey.*

(40.) Some Diseases of Lettuce and Cucumbers. July. *J. E. Humphrey.*

B. Hatch Experiment Station.

(11.) Report on Prevention of Potato-Rot. *W. P. Brooks.* Report on Fungicides and Insecticides on Fruits. Jan. *S. T. Maynard.*

12. Report on Insects [Bud-Moth, Spittle-Insects, Squash-Bug, Pea-Weevil, Bean-Weevil, May-Beetle, Plum Curculio, Onion-Maggot, Cabbage-Butterfly, Apple-Tree Tent-Caterpillar, Forest Tent-Caterpillar, Stalk-Borer, Pyramidal Grape-Vine Caterpillar, Grape-Berry Moth, Codlin-Moth, Cabbage-Leaf Miner, Gartered Plume-Moth]. April. *C. H. Fernald.*
13. Direction for use of Fungicides and Insecticides. *S. T. Maynard.* Girdling Grape-Vines. *J. Fisher.* April.
15. Experiments in Greenhouse Heating. Special Fertilizers for Plants Under Glass. Report on Varieties of Strawberries. Report on Varieties of Blackberries and Raspberries. Oct. *S. T. Maynard.*

MICHIGAN :

(2d report.) Report of Horticulturist [Seed-Testing, Test of Vegetables and Fruits]. *L. R. Taft.* Report of Entomologist [Arsenites, Various Insects]. *A. J. Cook.*
70. Vegetables—Varieties and Methods [Beans, Beets, Cabbages, Corn, Cucumbers, Lettuce, Peas, Peppers, Potatoes, Radishes, Squashes, Tomatoes]. Jan. *L. R. Taft.*
73. Kerosene Emulsion. Some New Insects. April. *A. J. Cook* and *G. C. Davis.*
76. Kerosene Emulsion. Oct. *A. J. Cook.*

MINNESOTA :

A. Agricultural Experiment Station.
(1890 report.) Report of Horticulturist [Miscellaneous Notes]. *S. B. Green.*
18. Notes on Strawberries, Raspberries, Sand-Cherries, Buffalo-berry, and Russian Mulberry. Evergreens from Seed. Summer Propagation of Hardy Plants. Sept. *S. B. Green.*
B. Owatonna Experimental Tree Station.
Report of Superintendent. [Lists of Fruits and Trees. Various Notes]. Jan. *E. H. S. Dartt.*

MISSISSIPPI :

(3d report.) Report of Horticultural Work [Brief Notes on the Work of the Year].
14. Injurious Insects [Pea and Bean-Weevils, Striped Cucumber-Beetle, Peach-Tree Borer, Plum-Curculio, Codlin-Moth, Insecticides and Spraying-Machinery]. March. *H. E. Weed.*

MISSOURI :

13 Spraying for the Codlin-Moth, Apple-Scab and Black Rot of Grape. Reports on Strawberries, Raspberries, Blackberries, Tomatoes, Peas and Potatoes. List of New Fruits for Testing. Jan. *J. W. Clark.*
15. Change of Seed. Potatoes. July. *H. J. Waters.*
(16.) Covering the Peach Trees to Protect the Fruit-Buds. Spread of Pear-Blight. Strawberry Tests. Potato Trials. Nov. *J. W. Clark.*

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(4th report.) Insects Injurious to Young Trees on Tree-Claims. *Lawrence Bruner.* Notes on Peas, Lettuce and Radishes. Experiments with Potatoes and Garden Vegetables. *J. G. Smith.*

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(3d report.) Melons, Potatoes, Sweet-Corn, Beans, Radishes, Cucumbers.

14. Potato Experiments. Dec. *R. H. McDowell* and *N. E. Wilson.*

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(1890 report.) Report of Botanical Department [Observations in Peach Orchards. Microscopic Study of Peach-Buds. Influence of Rainfall at Blooming-Time upon Subsequent Fruitfulness. Experiments for the Year upon Cranberry Diseases. The Fungous Diseases of the Sweet-Potato. Field Work of the Season. Fungous Diseases of Various Crops, (Potatoes, Cabbage, Radish, Turnip, Carrot, Onions, Spinage, Egg-Plant, Peppers, Horseradish, Hollyhock, Violet, Carnation, Mignonette.) Black-Knot of Plum and Cherry Trees. Nematodes as Enemies to Plants. The Weeds of New Jersey]. *Byron D. Halsted.* Report of the Entomologist [Notes of the Year. Insecticides. Insects affecting Sweet-Potatoes, Squash and Melon-Vines, Grape, Cranberry, Peach, Cabbage and Wheat. Miscellaneous Notes].

Special Bulletin L. Observations upon the Peach.

Special Bulletin M. Field Experiments with Soil and Black Rots of Sweet-Potatoes. Nov. *Byron D. Halsted.*

78. Destroy the Black-Knot of Plum and Cherry Trees. An Appeal. Jan. *Byron D. Halsted.*

79. Experiments with Nitrate of Soda on Tomatoes. Feb. *Edward B. Voorhees.*

(80.) Experiments with Fertilizers on Potatoes. March. *Edward B. Voorhees.*

82. The Rose-Chafer or Rose-Bug. July. *John B. Smith.*

NEW MEXICO:

3. A Preliminary Account of Some Insects Injurious to Fruits [Vine Leaf-Hopper, Grape-Vine Flea-Beetle, Codlin-Moth, Woolly Louse of the Apple, Oyster-Shell Bark-Louse, Apple-Tree Tent-Caterpillar, Scurfy Bark-Louse, Peach-Tree Borer, Peach-Aphis, Green June-Beetle, Plum-Aphis, Twelve-spotted Diabrotica. Spraying-Devices]. June. *C. H. Tyler Townsend.*

NEW YORK:

A. Cornell University Experiment Station (Ithaca).

(1890 report.) Report of Horticulturist. *L. H. Bailey.*

26. Experiences with Egg-Plants. March. *L. H. Bailey* and *W. M. Munson.*

28. Experiments in Forcing Tomatoes. June. *L. H. Bailey.*
30. Preliminary Studies of the Influence of the Electric Light Arc Lamp upon Greenhouse Plants. Aug. *L. H. Bailey.*
31. Forcing of English Cucumbers. Sept. *L. H. Bailey.*
32. Tomatoes. Oct. *L. H. Bailey* and *E. G. Lodeman.*
33. Wireworms. Nov. *J. H. Comstock* and *M. V. Slingerland.*
34. Dewberries. Nov. *L. H. Bailey.*
35. Combinations of Fungicides and Insecticides, and some New Insecticides. Dec. *E. G. Lodeman.*

(37.) Physalis. Pepino. Chorogi. Spanish Salsify. Influence of Depth of Transplanting upon the Heading of Cabbages. Verbena Mildew. Dec. *L. H. Bailey.*

B. State Experiment Station (*Geneva*).

(1890 report.) Report of Acting Horticulturist [Test of Small Fruits. Trials of New Vegetables. Comparison of Imported versus Home-grown Cabbage and Cauliflower-Seed. Test of Relative Yield of Tomatoes. Trial of Potatoes. Cross-Pollination of Fruits. Study of Pollen Influence. Insects, Fungi and the Remedies. Reports on Strawberries, Blackberries, Raspberries, Currants, Gooseberries, Beans, Corn, Celery, Cabbage, Cauliflower, Potatoes, Sweet-Potatoes, Peas and Tomatoes]. *C. E. Hunn.*

Report of Acting Pomologist [The Grape. Peaches. Some of the Most Common Fungi, with Preventives. Insects and Remedies. Varieties of Fruits Added in 1890. Arboretum]. *G. W. Churchill.*

30. Cabbage and Cauliflower. A Comparative Test of Imported versus American-grown Seed. Tomatoes. Gooseberry Mildew. May.
35. Some of the Most Common Fungi and Insects, with Preventives [Grape-Diseases. Apple and Pear-Scab. Black-Knot of Plum and Cherry. Leaf-Blight of the Strawberry. Orange-Rust and Anthracnose of the Raspberry. Insecticides and Fungicides. Various Injurious Insects]. Aug.
36. Small Fruits [Strawberries, Raspberries, Blackberries, Currants and Gooseberries]. Sept.

NORTH CAROLINA:

(12th report.) Report of the Horticulturist [Miscellaneous Notes, with Lists of Fruits Grown]. *W. F. Massey.*

(13th report.) Report of Horticulturist. *W. F. Massey.*

(14th report.) Report of Horticulturist. *W. F. Massey.*

76. Plant Diseases, and How to Combat Them. March. *Gerald McCarthy.*

77b. The Injury of Foliage by Arsenites. A Cheap Arsenite. Combination of Arsenites with Fungicides. July. *B. W. Kilgore.*

78. Some Injurious Insects, with Remedies. July. *Gerald McCarthy.*

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2. Small Fruits. April. *C. B. Waldron.*

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(1890 report.) Report of Horticulturist, *W. J. Green;* Entomologist, *C. M. Weed.*

2. Miscellaneous Experiments in the Control of Injurious Insects. Some Common Cabbage-Insects. Feb. *C. M. Weed.*

6. Experiments with Small Fruits. Diseases of the Raspberry and Blackberry. Oct. *W. J. Green* and *F. Detmers.*

9. Apple-Scab. The Spraying of Orchards. Dec. *W. J. Green.*

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(10.) Experiments with Codlin-Moth and with a Combined Fungicide and Insecticide. Hop-Louse. Apr. *F. L. Washburn.*

(11.) Notes on Potatoes. May. *H. T. French.*

(12.) Comparative Test of Strawberries for 1891. *Geo. Coote.*

(14.) Apple-Tree Tent-Caterpillars. The Branch and Twig-Burrower. *F. L. Washburn.*

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(1889 report.) Systematic Testing of New Varieties. Germination-Tests. Should Farmers Raise Their Own Vegetable-Seeds? Notes on New Varieties of Vegetables. *Geo. C. Butz.* Experiments on the Production of Root-Tubercles. *Wm. A. Buckhout.*

(1890 report.) Tests of Varieties of Potatoes. *Wm. H. Caldwell.* Tests of Varieties of Vegetables. Black-Knot of Plums. A Few Ornamental Plants. *Geo. C. Butz.*

14. Tests of Varieties of Vegetables for 1890. Jan. *Geo. C. Butz.*

16. Culture of the Chestnut for Fruit. Analysis of Several Varieties of Chestnuts. July. *Wm. A. Buckhout.*

RHODE ISLAND:

(3d report.) Report of Horticultural Division [Experiments with Potatoes. Experiments with Parsnips. The Trial of New Varieties of Fruits and Vegetables.] *L. F. Kinney.*

14. Potato-Scab, Blight and Rot. Notes on Transplanting Onions. *L. F. Kinney.*

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(3d report.) Report of Horticulturist. *Chas. A. Keffer.* Notes on Potatoes. *Luther Foster.*

22. Various Injurious Insects. March. *I. H. Orcutt* and *J. M. Aldrich.*

(23.) Various Fruits and Vegetables. April. *Chas. A. Keffer.*

26. The Strawberry, Sand Cherry. Notes on Varieties of the Plum. Apples and Crabs. *Chas. A. Keffer.*

TENNESSEE:

(1 Vol. IV.) Black-Knot of Plum and Cherry. Pruning Fruit-Trees. Jan.

C Special. Treatment of Certain Fungous Diseases of Plants [Black Rot and Brown Rot of Grapes. Apple-Scab. Downy Mildew of the Vine. Powdery Mildew of the Grape, Gooseberry, Rose and Apple. Leaf-Brownness of the Pear and Quince. Potato-Rot].

3. Vol. IV. The True-Bugs, or Heteroptera, of Tennessee. *H. E. Summers.*

4. Vol. IV. Some Fungous Diseases of the Grape. *F. L. Scribner.*

TEXAS :

(3d report.) Report of Horticulturist. *S. A. Beach.*

(16.) Drainage Experiments with Irish Potatoes, Cabbage and Strawberries. Russian Fruits. List of Fruits on Trial.

UNITED STATES (Department of Agriculture) :

A. Division of Garden and Grounds.

(1890 report.) Catalogue of Economic Plants in Department Collection. *Wm. Saunders.* Papers on Horticultural and Kindred Subjects: Reprinted from Dept. of Agr. Reports, 1863–1889. [Landscape-Gardening. Draining Lands. Sowing Seeds and Raising Young Plants of Forest-Trees. Making and Keeping Lawns. Spring and Fall Planting of Trees. Keeping Hedges Cultivation. Mechanical Preparation of Soil. Mulching. Situations for Orchards. Orchard Planting. Management of Orchards. Pruning. Pear-Culture. Native Grapes. Grape-Mildew. Foreign Grapes in Glass Structures. Inside Borders for Graperies. Thrips on Grapes. Propagating by Cuttings. Sowing Seeds. Seed-Saving. Rotation in Cropping. Expedients for Promoting Fruitfulness in Plants. Importance of a Uniform Supply of Water in Plant-Culture. Liquid Manure for Plants in Pot-Culture. Flower-Pots. Night Temperature in Glass Structures. Watering Plants in Pots. Water-Plants. Glazing Greenhouse Roofs. Raspberry-Culture. Figs. Vanilla. India-Rubber Plants. Citron. Special Inquiries and Answers. Well-ripened Wood. Orange and Pineapple-Culture]. *Wm. Saunders.*

B. Division of Vegetable Pathology.

Additional Evidence of the Communicability of Peach-Yellows and Peach-Rosette. *E. F. Smith.*

Circular 10. Treatment of Nursery Stock for Leaf-Blight and Powdery Mildew. *B. T. Galloway.*

(Jour. of Mycology, 2 Vol. VI.) New Hollyhock Diseases, *E. A. Southworth;* New Knapsack Sprayer, *B. T. Galloway;* Copper-Soda and Copper-Gypsum as Remedies for Grape Mildew, *I. Nessler;* Combating the Potato-Blight, *J. H. Bunzli;* Index to North American Mycological Literature. Sept. 1890.

(Jour. of Mycology, 3 Vol. VI.) Experiments in the Treatment of Plant Diseases (Black Rot of Grape). *B. T. Galloway* and *D. G. Fairchild;* Diseases of the Grape in Western N. Y., *D. G. Fairchild;* Perennial Mycelium of the Fungus of Blackberry-Rust, *F. C. Newcombe;* Field Notes for 1890, *E. F. Smith;* A New Pear Disease, *B. T. Galloway;* Index to N. A. Mycological Literature, *D. G. Fairchild.* Jan.

(Jour. of Mycology, 4 Vol. VI.) Treatment of Pear Leaf Blight and Scab in the Orchard, *B. T. Galloway* and *D. G. Fairchild;* The Peach-Rosette, *E. F. Smith;* Tuberculosis of the Olive, *N. B. Pierce;* Ripe-Rot of Grapes and Apples, *E. A. Southworth;* Index to N. A. Mycological Literature, *D. G. Fairchild.* Apr.

(Jour. of Mycology, 1 Vol. VII.) Sweet-Potato Black Rot, *B. D. Halsted* and *D. G. Fairchild;* Treatment of Apple-Scab, Septoria of Raspberry and Blackberry and Potato-Rot, *E. S. Goff;* Treatment of Apple-Scab and Potato-Rot, *M. Hatch;* Diseases of the Orange in Florida, *L. M. Underwood;* Peach-Blight, *E. F. Smith;* The Improved Japy Knapsack Sprayer, *B. T. Galloway;* Index to N. A. Mycological Literature, *D. G. Fairchild.* Sept.

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3. Classification and Synopsis of the Wild Grapes of North America. *T. V. Munson.*

4. Relative Merits of Various Stocks for the Orange. *H. E. Van Deman.*

D. Division of Entomology.

23. Reports of Observations and Experiments in the Practical Work of the Division [Report on Various Methods for Destroying Scale-Insects, *D. W. Coquillet.* Entomological Notes for 1890, *Mary E. Murtfeldt.* Report on the Work of the year, *Herbert Osborn.*]

25. Destructive Locusts. *C. V. Riley.*

Circular 1, 2nd Series. Condensed Information Concerning Some of the More Important Insecticides.

Circular 2, 2nd Series. Hop-Plant Louse and Remedies. June.

(Insect Life, 3 Vol. III.) An Experience with Rose-Bugs, *J. B. Smith;* The Bermuda Peach-Maggot and Orange-Rust; Two Grape Tests in Alabama; An Orthesia on Coleus; An Experience with the Gypsy-Moth; Remedies for the Harlequin Cabbage-Bug.

(Insect Life, 4 Vol. III.) London Purple for the Rose-Chafer. A Peach-Tree Leaf-Beetle. The Pear-Slug on Plum. Fighting the Rose-Chafer. Wireworm Damage to Onions. The Grape-Curculio. Scale-Insects in California The Rose-Chafer on Clay Lands. Tomato-Worm. The Pear-Slug on Quince. Fumigating for Scale-Insects.

(Insect Life, 5 Vol. III.) California Scale-Insects. The Grape Phylloxera. Insecticide Machinery. Fertilizers as Insecticides. Plum and Apple-Curculio. An Experience with the Rose-Bug. Notes on the Plum-Curculio and Plum-Gouger. Notes Upon Injurious Insects of the Year in Canada.

(Insect Life, 6 Vol. III.) Prof. Harvey's Bulletin on the Apple-Maggot. The Effects of Arsenites on Plants. Kerosene Extract of Pyrethrum as an Insecticide. Practical Notes on the Use of Insecticides. A Rose Cecidomyiid.

(Insect Life, 7 & 8 Vol. III.) The Plum-Gouger and the Curculio. Pear-Leaf Blister-Mite. Apple Bucculatrix. Stag-Beetle Borer on Pear. The Strawberry-Leaf Flea-Beetle in Indiana. Sweet-Potato Root-Borer. A Winter Wash for Scale-Insects. The Tarnished Plant-Bug Damaging Celery.

(Insect Life, 9 & 10 Vol. III.) Economic Entomology in Canada. Insecticide Experiments in New Jersey. Insecticide Experiments in Massachusetts. Efforts to Stamp Out the Gypsy-Moth. The Bud-Moth. Discussiou on the Gypsy-Moth. The Ravages of *Liparis* (*Psilura*) *Monacha* in Germany, and Means of Defence. A New Scale-Insect from California. The Quicksilver Remedy for Phylloxera. California Peach-Tree Borer. Codlin-Moth in New Zealand. Spraying for the Codlin-Moth in Oregon. The Mealy Bug. Sweet-Potato Root-Borer. Figs. Unslaked Lime against the Rose-Chafer. Fig-Beetles. Injury to Asters by the Black Blister-Beetle. Some Oregon Work Against Noxious Insects. Remedies for the Yellow Scale.

(Insect Life, 11 & 12 Vol. III.) Experiments with a Date-Palm Scale. Observations on Injurious Insects of Arkansas and Tennessee. History of the Hydrocyanic Gas Treatment for Scale-Insects. A new Pest to Prune Trees. The Pear Blight-Beetle and Plum Plant-Louse. Grape-Vine Plume-Moth. Massachusetts Laws Against the Gypsy-Moth. Hot Water for the Rose-Chafer. Paris Green for Cabbage-Worms. Hop-Lice on the Pacific Coast.

(Insect Life, 1 & 2 Vol. IV.) New Jersey Bulletin on the Rose-Chafer. The Squash-Borer and Remedies Therefor. Notes of the Season. Notes of the Year in New Jersey. New Saw-Fly Enemy to Sweet-Potatoes. Kerosene Emulsions. Imbricated Snout-Beetles Injuring Apple Trees. Leaf-Footed Plant-Bug on Currants. Quassia for the Hop-Aphis. Destroying the Rose-Chafer.

(Insect Life, 3 & 4 Vol. IV.) Tomato Flea-Beetle. A New Enemy to Pear-Leaves. A Grape-Vine Flea-Beetle in New Mexico. Cocoanut-Palm Weevil. *Rhynchites bicolor* injuring Cultivated Roses. Remedies for Squash-Borer. New Means Against Orange-Pests.

(Insect Life, 5 and 6 Vol. IV.) Twig-Girdler on Fig Tree. Spraying for Codlin-Moth. Tin Can Remedy for Cut-Worms. Strawberry Leaf-Roller. The Woolly Root-Louse of the Apple. The Grape Phylloxera in the United States. Plant-Louse on Celery. The Rose Diaspis. Fumigating at Night Not Necescary. Hemlock Damage by Larch Saw-Fly. The "Black Vine-Weevil."

E. *Office of Experiment Stations.*

Miscellaneous Bulletin No. 3. Proceedings of the Fourth Annual Convention of the Assoc. of American Agr. Colleges and Experiment Stations. *A. W. Harris* and *H. E. Alvord.*

Circular No. 20. Organization List of the Agricultural Experiment Stations in the United States. June.

Experiment Station Bulletin No. 2. Digest of the Annual Reports of the Agricultural Experiment Stations for 1888. Part 2.

Farmers' Bulletin No. 4. Fungous Diseases of the Grape and their Treatment. *B. T. Galloway.*

UTAH :

(2d report.) Report of Horticulturist. Experiments with Cabbages and Cauliflowers. *E. S. Richman.*

3. Experiments with Garden Vegetables. Jan. *E. S. Richman.*
5. Potato Trials. March. *J. W. Sanborn.*
10. Experiments with Strawberries, Peas and Beans. Dec. *E. S. Richman.*

VERMONT :

(4th report.) Report of Horticulturist [Test of Vegetables. Bordeaux Mixture with Paris Green. Grapes. Blackberries. Dewberries. Currants. Gooseberries. Raspberries. Strawberries]. *C. W. Minott.* Report of Botanist [Fungi. Potato-Blight and Rot. Apple-Rust and Cedar-Apples. Onion-Smut. Black-Knot of Plum and Cherry and Notes on some other Fungous Diseases which are prevalent]. *L. R. Jones.*

24. Potato-Blight and Rot. May. *L. R. Jones.*

VIRGINIA :

8. Potato Tests. Jan. *W. B. Alwood.*
9. Tomatoes, Cultural and Variety Work. Feb. *W. B. Alwood.*

WASHINGTON (*Board of Horticulture*):

Bulletin 1. The State Board of Horticulture. Rules and Regulations. The Green Aphis. The Woolly Aphis. The San José Scale. Codlin-Moth. Apple-Tree Tent-Caterpillar. Pear and Cherry Tree Slug. Hop-Louse. Oyster-Shell Bark-Louse. Imported Currant-Worm. Currant-Fly.

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WEST VIRGINIA :

(3d report.) Report of Entomologist [Various Injurious Insects]. *A. D. Hopkins.*

14. Various Injurious Insects [Striped Flea-Beetle, Plum-Curculio, Codlin-Moth, Imported Currant-Worm, etc. Feb. *A. D. Hopkins.*
15. Raspberry. Gouty-Gall Beetle. March. *A. D. Hopkins.*

WISCONSIN :

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2. Plant-Lice. Aug. *F. J. Niswander.*

§ 8. *Subject Index of Experiment Station Horticultural Literature in North America for 1891 (including Publications of the Department of Agriculture).*

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Ala. 29. Ala. Canebrake 12. Ark. 2d rep. p. 82; 3d rep. p. 39. Cal. 1889 rep. pp. 88, 110. Colo. 17; 3d rep. pp. 31, 199. Del. XI.; 2d rep. pp. 103, 104; 3d rep. pp. 30, 97, 98, 100. Fla. 14. Ga. 11; 15. Iowa 14. Kan. 26. Ky. 32. Me. 1890 rep. p. 117. Md. 3d rep. p. 104. Mass. Hatch 15. Minn. 18; 1890 rep. p. 27. Mo. 16. N. Y. State 30; 9th rep. p. 258. N. C. 12th rep. p. 109. N. Dak. 2. Ohio 6 Vol. IV. Ore. 12. Penn. 1889 rep. p. 163. R. I. 3d rep. p. 158. S. Dak. 23; 26; 2d rep. p. 29. Texas 16. Utah 10. Vt. 4th rep. p. 185. Wis. 7th rep. p. 213.

STRAWBERRY, DISEASES AND INSECTS OF—
Black Pavia, Mass. 15. *Blight*, Conn. State 1889 rep. p. 174. Del. A, Special. Ga. 15. Iowa 13. Md. 3d rep. p. 106. N. Y. State 35; 36. Vt. 4th rep. p. 142. *Crown-Borer*, N. Y. State 35; 36. *Flea-Beetle*, Insect Life Vol. III. 7 and 8 p. 317. *Leaf-Roller*, Insect Life Vol. IV. 5 and 6 p. 209. *Root-Borer*, N. Y. State 35; 36. *Rust*, Conn. State 1890 rep. p. 102. Mass. Hatch 15. *Weevil*, Insect Life Vol. III. 9 and 10 p. 359.

STRAWBERRY, MISCELLANEOUS—
Analyses, Mass. State 8th rep. p. 305.

SULPHURING DRIED FRUITS—
Cal. 1890 rep. p. 131.

SWEET-POTATO, CULTURE AND VARIETIES—
Ala. 31. Ark. 2d rep. p. 91. Del. XI.; 3d rep. p. 27. Ga. 11. La. 8. Neb. 1890 rep. p. 292. N. Y. State 9th rep. p. 296.

Sweet-Potato, Diseases and Insects of—

Black-Legged Tortoise-Beetle, N. J. 11th rep. p. 471. *Black-Rot*, N. J. Special M. Jour. Mycology 4 Vol. VI. *Golden Tortoise-Beetle*, N. J. 11th rep. 471. *Mottled Tortoise-Beetle*, N. J. 11th rep. p. 471. *Root-Borer*, Insect Life Vol. III. 7 and 8 p. 334; 9 and 10 p. 404. *Saw-Fly*, Insect Life 1 and 2 Vol. IV. p 74. *Soil-Rot*, N. J. Special M. *Two-Striped Beetle*, N. J. 11th rep. p. 471.

Sweet-Potato, Miscellaneous—

Analyses, Ark. 3d rep. p. 18.

Tamarind—

U. S. Dept. Agr. 1890 rep. p. 593.

Taro—

Cal. 95.

Tomato, Culture and Varieties—

Ark. 2d rep. pp. 95, 100; 3d rep. p. 29. Colo. 3d rep. pp. 41, 193. Del. 2d rep. p. 62. Del. XI.; 3d rep. p. 30. Ga. 11. Ky. 32. Me. 1890 rep. pp. 108, 111. Md. 11; 3d rep. pp. 80, 104. Mich. 70. N. J. 79. N. Y. Cornell 28, 32, 37; N. Y. State 30; 9th rep. p. 297. Penn. 14; 1889 rep. pp. 164, 170, 176; 1890 rep. p. 165. S. Dak. 23. Vt. 4th rep. p. 178. Va. 9.

Tomato, Diseases and Insects of—

Blight, Wash. B'd of Hort. Bull. 2. *Cladosporium*, Conn. State 1890 rep. p. 95. *Corn-Worm*, N. J. 11th rep. p. 516. *Flea-Beetle*, N.Y. State 9th rep. p. 307. Insect Life Vol. IV. 3 and 4 p. 135. *Fusarium*, Conn. State 1890 rep. p. 95. *Macrosporium*, Conn. State 1890 rep. p. 95. *Potato-Beetle*, see Potato, Diseases and Insects of. *Potato-Rot*, Conn. State 1890 rep. p. 95. N. Y. Cornell 32. *Stalk-Borer*, Mass. Hatch 12. *Worm*, Del. 2d rep. p. 126. N. C. 78. S. Dak. 22. U. S. Dept. Agr. Div. of Entomology 23; Insect Life Vol. III. 4 p. 171.

Transplanting—

Influence of, on Heading of Cabbages, N. Y. Cornell 37.

Turnip, Culture and Varieties—

Ont. Agr. Coll. 16th rep. p. 174. Del. 2d rep. p. 62. Me. 1890 rep. pp. 108, 109, 110. Neb. 1890 rep. p. 298. S. Dak. 23. Vt. 4th rep. p. 178.

Turnip, Diseases and Insects of—

Club-Root, N. J. 11th rep. p. 348. *Flea-Beetle*, Can. Exp. Farm 11. *Root-Rot*, N. J. 11th rep. p. 350.

Turnip, Miscellaneous—

Analyses, Mass. State 8th rep. pp. 293, 299.

Vanilla—

U. S. Dept. Agr. 1890 rep. p. 595; Saunders' Papers on Hort. and Kindred Subjects p. 89.

VERBENA, NOTE ON—
N. Y. Cornell 30.

VERBENA, DISEASES—
Mildew, N. Y. Cornell 37.

VIOLET, DISEASES AND INSECTS OF—
Nematodes, N. J. 11th rep. p. 366. *Fungi*, *Various*, N. J. 11th rep. p. 366.

WALNUT—
Cal. 1889 rep. pp. 87, 110, 196; 1890 rep. pp. 270, 280. N. C. 12th rep. p. 108.

WATERMELON, CULTURE AND VARIETIES—
Ala. 28. Colo. 3d rep. p. 192. Del. 2d rep. p. 60. Fla. 14. Ky. 32. Me. 1890 rep. p. 109. Neb. 1890 rep. p. 302. Nev. 3d rep. p. 17. Utah 3.

WATERMELON, DISEASES AND INSECTS OF—
(See MUSKMELON, DISEASES.)

WILLOW, CULTURE AND VARIETIES—
Fl. 14. N. C. 12th rep. p. 110. R. I 3d rep. p. 162. W. Va. 3d rep. p. 113.

WILLOW, DISEASES AND INSECTS OF—
Cecropia Emperor-Moth, S. Dak. 22. *Saw-Fly*, S. Dak. 22. *Cottonwood Leaf-Beetle*, S Dak. 22.

WINDBREAKS—
N. Dak. 2.

§ 9. *Books of 1891.*

UPON HORTICULTURE AND SOME KINDRED TOPICS, EXCLUSIVE OF THE REPORTS OF ORGANIZATIONS.

Andersen, M. P. Frukthuset nied Dertil Hörande Kulturer. Anderson, Jönköping, Sweden.

Andrè, Ed. L'École Nationale, d'Horticulture de Versailles. Paris.

Bailey, L. H. Annals of Horticulture for 1890. Rural Publishing Co., New York.

— The Nursery Book. Rural Publishing Co., New York.

Baltet, Charles. L'Horticulture Française. .... depuis, 1789. Paris.

Barbut. Agenda Vermorel, Viticole et Agricole. Montpellier and Paris.

Beissner, L. Einheitliche Koniferen-Benennung. Ludwig Möller, Erfurt.

— Handbuch der Nadelholzkunde. Paul Parey, Berlin.

Bel, M. J. La Rose. Toulouse.

Bellair, G. Ad. Les Arbres Fruitiers. Baillière, Paris.

Benecke, Dr. Franz. Proefnemingen ter Bestrijding der "Sereh." G. C. T. van Dorp & Co., Semarang, Java.

Bergmann, Ernest. Berlin et son Exposition Horticole de 1890. Paris.

Bertram, Max. Gärtnerisches Planzeichnen. Max Bertram, Blasewitz, Dresden.

Betten, Robert. Unsere Blumen am Fenster. Trowitzsch & Sohn, Frankfurt a. O.

Blomeyer, Dr. Adolf. Die Kultur der Landwirtschaftlichen Nutzpflanzen. Finished by Dr. Henry Settegast. Vol. ii. C. F. Wintersche, Leipzig.

Bois, D. Atlas des Plantes de Jardin et d'Appartement. Paul Klincksieck, Paris.

— Les Plantes d'Appartement et les Plantes de Fenêtres. J. Baillière et fils, Paris.

Brannsdorf, W. Die Blumenbinderei. A. Hartleben, Vienna.

Brooks, C. Mushrooms and Their Culture. London.

Büsgen, M. Der Honigtau. Gustav Fischer, Jena.

Canstatt, Heinrich F. S. von. Durch des Gartens kleine Wunderwelt. Trowitzsch & Son, Frankfurt a. O.

Carman, E. S. The New Potato Culture. Rural Publishing Co., New York.

Carrière, E. A. Du Sulfatage Horticole et Industriel. Paris.

Combes, Victor. Expériences Pratique sur la Culture des Vignes Américaines. Camille Coulet, Montpellier.

Constatin et Dufour. Nouvelle Flore des Champignons. Paul Dupont, Paris.

Cooke, M. C. British Edible Fungi. Kegan, Paul & Co., London.

Correvon, H. Catalogue of the Plants in the Botanic Gardens of Ghent. Jules Carey, Ghent.

Crozier, A. A. Popular Errors About Plants. Register Publishing Co., Ann Arbor, Michigan.

— The Cauliflower. Register Publishing Co., Ann Arbor, Michigan.

Dammann, H. Verzeichnis der Orchideen. Ludwig Möller, Erfurt.

Deberitz, E. Bibliothek gärtnerischer Spezialkulturen. Vol. v. Anweisung zur Kamellienkultur. Das veredeln der Rosen im Winter. E. Thiele, Leipzig.

De Salis, Mrs. Floral Decorations à la Mode, Suggestions and Descriptions. Longmans, Green & Co., London.

Dippel, Dr. Handbuch der Laubholzkunde. Paul Parey, Berlin.

Dixon, Charles. Idle Hours with Nature. Chapman & Hall, London.

Drude, Dr. Oswald. Handbuch der Pflanzengeographie. (1890.) Engelhorn, Stuttgart.

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Engelmann, W. Botanisches Addressbuch. Leipzig.

Entleutner, Anton. Die Immergrünen Ziergehölze von Süd Tirol, Munich.

Falconer, Wm. Mushrooms: How to Grow Them. Orange Judd Co., New York.

French, C. Hand-Book of the Destructive Insects of Victoria.

Greiner, T. Practical Farm Chemistry. La Salle, N. Y.

— The New Onion Culture. La Salle, N. Y.

Goethe, R. Mitteilungen über Obst- und Gartenbau. Revised by R. Mertens. Rud. Bechtold, Wiesbaden.

Goff, E. S. A Syllabus of Horticulture for the Use of Classes. State Journal Printing Co., Madison, Wisconsin.

Gordon, W. J. Our Country's Flowers and How to know Them. Day & Son, London.

Hallier, Ernest. Asthetik der Natur. Ferdinand Enke, Stuttgart.

Hampel. Die Moderne Teppichgärtnerei. Fourth edition, revised and enlarged. Paul Parey, Berlin.

Heinemann, F. C. Die Kultur der bekanntesten Blumenzwiebeln und Knollengewächse. H. Voigt, Leipzig.

Hennings, Paul. Der Hausschwamm. A Seydel, Berlin.

Henslow, George. Making of Flowers. William Blackwood & Sons, Edinburgh.

Herrmann, R. Praktisches Handbuch der Industriellen Obst- und Gemüseverwertung. Paul Parey, Berlin.

Hesse, Dr. Rudolph. Die Hypogaen Deutschlands. Ludwig Hochstetter, Halle.

Jubisch, Max. Bibliothek Gärtnerischer Spezialkulturen. Die Kultur und Treiberei der Erdbeere, und ihre Verwertung. E. Thiele, Leipzig.

— Bibliothek Gärtnerischer Spezialkulturen. Ueber Kultur und Verwertung der schwarzen Johannisbeere. E. Thiele, Leipzig.

Karnasch, Paul. Crosnes (Stachys affinis). (1890.) Paul Karnasch, Breslau.

Laurencie, Comte de la. Plantation et Greffage des Vignes Américaines. Paris.

Lebl, M. Beerenobst und Beerenwein. Paul Parey, Berlin.

— Katechismus der Zimmergärtnerei. J. J. Weber, Leipzig.

Lelong, B. M. Orange Culture. The Orange from Seed to Grove. State Board of Horticulture, San Francisco.

Long, E. A. Landscape Gardening. Popular Gardening Publishing Co., Buffalo, N. Y.

Lowe, E. J. British Ferns and Where Found. Swan, Sonnenschein & Co., London.

Lucas, Ed, Kurze Anleitung zur Ohstkultur. Eug. Ulmer, Stuttgart.

Malden, Walter J. Tillage and Implements. George Bell & Sons, London.

Mayr, Dr. H. Monographie der Abietineen des Japanischen Reiches. Gustave Himmer, Munich.

Mellican, Albert. The Travels and Adventures of an Orchid-Hunter, Cassell & Co., London.

Mertens, R. Dörrbüchlein für den Kleinen Haushalt. R. Mertens, Wiesbaden.

Molyneux, E. Grape-Growing for Amateurs. L. Upcott Gill, London.

Morton, James, Chrysanthemum Culture for America, Rural Publishing Co., New York.

Mottet, S. La Mosaïculture (carpet-bedding). Octave Doin, Paris.

Mouillefert, P. Les Vignobles et les Vins de France et de l'Étranger. Camille Coulet, Montpellier.

Murtfeldt, Mary E. Outlines of Entomology. Tribune Printing Co., Jefferson, Mo.

Naudin, Ch. Description et Emploi des Eucalyptus Introduits en Europe. Paris.

Ollech, Dr. von. Ueber den Humus und Seine Beziehung zur Bodenfruchtbarkeit. (1890.) Bodo Grundmann, Berlin.

Parsons, Samuel. Landscape Gardening. Putnam's Sons. New York.

Pucci, Angiolo. Les Cypripedium et genre affines. L. Nicolai, Florence.

Rainer, Michael. Bibliothek Gärtnerischer Spezialkulturen. Vol. vi. Das Treiben des Gemüses. E. Thiele, Leipzig.

Ramé, A. Les Insectes Nuisible. Part 1. Paris.

Reichenbach, Heinrich Gustav. Xenia Orchidacea. Continued by Dr. F. Kranzlin. III. Vol. (1890.) F. A. Brockhaus, Leipzig.

Robinson, W. The Garden Annual, Almanack and Address Book. "The Garden" Office, London.

Sargent, Charles Sprague. The Silva of North America. Vols, i-iii. (1890-1). Houghton, Mifflin & Co., Boston and New York.

Schmidt, J. C. Abreisskalender. J. C. Schmidt, Erfurt.

— Das Gärtchen der Kinder. J. C. Schmidt, Erfurt.

— Die Obstverwertung für das Haus. J. C. Schmidt, Erfurt.

Schübeler, Dr. F. C. Tillaeg til Viridarium Norvegicum. Kristiana.

Schwarz, Frank. Förstliche Botanik. Paul Parey, Berlin.

Sorauer, P. Populäre Pflanzenphysiologie für Gärtner. E. Ulmer, Stuttgart.

Stoll, Dr. Rudolf. Die Amerikanischen Frühpfirsiche. Stoll, Kloster-Neuburg.

Taplin, J. A. How to Grow Onions. Houlston & Sons, London.
Trelease, Wm. Missouri Botanical Garden. Second Annual Report. St. Louis, Mo.
Tschaplowitz, Dr. F. Gesammelte Gartenwissenschaftliche Aufsätze und Versuchsergebnisse. (1890.) Part 1. Eugen Franks, Oppeln.
Tuckwell, Rev. W. Tongues in Trees, and Sermons in Stones. George Allen, London.
Veitch, James & Sons. A Manual of Orchidaceous Plants. Part vii. James Veitch & Sons, London.
Viala et Nanot. Tableau du Greffage de la Vigne. Camille Coulet, Montpellier.
Vilmorin. Les Plantes Potageres. Second edition. Vilmorin-Andrieux et Cie., Paris.
Ward, H. W. My Gardener. Eyre & Spottiswoode, London.
Weed, Clarence M. Insects and Insecticides. Hanover, N. H.
Williams, Jas. Sketches of Village Buildings from Designs. Bentley & Son, London.
Winslow, I. O. The Principles of Agriculture for Common Schools. American Book Co.
Woods, W. Plants Indigenous and Naturalized in the Neighborhood of Sidney. Sidney, Australia.

§ 10. *Horticultural Periodicals of the World.*

An effort has been made to obtain recent information from every horticultural journal in the world. The asterisk (*) in the following catalogue denotes that the journal in question is known to have been in continuance at the close of 1891.

NORTH AMERICA.

American Farm and Horticulturist.* L. J. Thompson. *Quarterly;* 25 cts. Lakewood, Ohio.
American Florist.* American Florist Co. *Weekly;* $1. Chicago.
American Gardening.* Rural Pub. Co. *M.;* $1. New York.
California Fruit Exporter.* Scott & Wood. *M.;* $1. San Francisco.
California Fruit Grower.* B. N. Rowley. *W.;* $3. San Francisco.
Canadian Horticulturist.* Ont. Fruit Growers' Ass. *M.;* $1. Grimsby, Ontario.
Florists' Exchange.* A. T. de la Mare Co. *W.;* $1. New York.
Fruit Growers' Journal.* *Semi-Monthly.* Cobden, Ill.
Fruit Trade Journal.* *W.;* $3. New York.
Fruits and Flowers.* D. H. Stearns. *M.;* $2. Portland, Oregon.
Garden and Forest.* C. S. Sargent. *W.;* $4. New York.
Green's Fruit Grower.* C. A. Green. *M.;* 50 cents. Rochester, N. Y.
Horticultural Art Journal.* *M.;* Rochester, New York.
Journal of the Columbus Horticultural Society.* *Quart.;* Columbus, Ohio.
Leaflet.* E. S. Thompson. *M.;* 25 cents. West Casco, Mich.
Lindenia.* *M.;* (An English edition of the French journal, with a central American office in New York.)
Mayflower.* J. L. Childs. *M.;* 50 cents. Queens, N. Y.
Meehan's Monthly.* T. Meehan. *M.;* $2. Germantown, Philadelphia.
Nebraska Horticulturist.* J. G. Carpenter. *Quart.;* 25 cents. Bower, Neb.
Northwest Horticulturist.* Boothroyd & Tonneson. *M.* Tacoma, Wash.
Orchard and Garden.* *M.;* Little Silver, N. J.
Ornamental and Forest Tree Grower.* J. J. Pinney. *M.;* 50 cents. Evergreen, Wis.
Park's Floral Magazine.* G. W. Park. *M.;* $1. Libonia, Pa.
Science and Horticulture.* C. R. Orcutt. *M.;* $2. Orcutt, Cal.

Seed Time and Harvest.* *M.;* La Plume, Pa.
Smith's Small Fruit Farmer.* B. B. Smith. *Quart.;* 50 cents. Lawrence. Kansas.
Southern Floral Magazine. Morton & Titus. *M.;* 50 cents. Clarksville, Tenn.
Success with Flowers.* Dingee & Conard Co. *M.;* 25 cents. West Grove. Pa.
Vick's Magazine.* Vick Pub. Co. *M.;* 50 cents. Rochester, N. Y;
Vineyardist.* J. H. Butler. *S.-M.;* $1. Penn Yan, N. Y.
Western Garden.* J. W. Page. *M.;* Des Moines, Iowa.
Woodsman.* Geo. W. Caldwell. *M.;* 50 cents. Evergreen, Alabama.

ENGLAND.

Amateur Gardening. London.
Botanical Magazine.* London.
Fruit Farm Review.
Garden.* *W.* London.
Garden Almanac. London.
Gardeners' Chronicle.* *W.;* 15 s. London.
Gardeners' Magazine.* *W.;* 11 s. 6 d. London.
Gardening Illustrated. London.
Gardening World.* Brian Wynne. *W.;* 6 s. 6 d. London.
Horticultural Times.* Alfred Root & Son. *W.;* 6 s. 6 d. London.
Journal of Horticulture.* Robert Hogg. *W.* London.
Northern Gardener.* C. H. Betts. *W.;* 6 s. 6 d. Manchester.

IN FRENCH.

Annales de l' Horticulture. Brussels.
Annuaire Général d' Horticulture. Toulouse.
Belgique Horticole. Ghent.
Bulletin d' Arboriculture. Ghent.
Bulletin d' Arboriculture, de Floriculture, et de culture Potagère. Ghent.
Bulletin de la Fédération des Sociétés d' Horticulture de Belgique. Minister of Agriculture. Ghent.
Bulletin de la Société Centrale d' Horticulture de Mons. *M.;* 3 francs. Mons.
Bulletin de l' Horticulture. Clermont (Oise).
Bulletin de la Société d' Horticulture et de Viticulture du Puy-de-Dome. *Quart.;* 10 francs. Clermont, Ferrand.
Bulletin de la Société Horticole, Viticole, et Forestière de Sens. Auxerne,
Bulletin de la Société d' Horticulture de Bougival.* 6 francs. Bougival, France.
Bulletin du Circle Floral d' Anvers. Anvers.
Bulletin du Syndicat des Viticulteurs de France. Paris.
Bulletin Horticole. Huy.
Bulletin Mensuel de la Société d' Horticulture Pratique du Rhone. Lyons.
Chasse et Pêche, Acclimation et Élevage. Organ of the Royal Society of St. Hubert. Brussels.
Ferme (la) et Le Jardin.* C. C. Bouillot. *S.-M.;* 4 francs. Huy.
Flore des Serres et Jardins de l' Angleterre.* Ghent.
Horticulteur. Mons.

Jardin.* H. Martinet. *S.-M.;* 12 francs. Paris.
Jardin de la France, Tours.
Journal d' Agriculture et d' Horticulture.* *S.-M.;* 5 francs. Bordeaux.
Journal de Horticultue Pratique, Paris.
Journal des Orchidées.* Lucien Linden. *S.-M.*; 10 francs. Brussels.
Journal de la Société Centrale d' Horticulture. Paris.
Journal de Vulgarisation de l' Horticulture. Paris.
Journal des Roses.* Pierre Cochet. *M.;* 12. francs. Paris.
Illustration Horticole.* J. Linden. *M.;* 30 francs. Brussels.
Lindenia, Iconographie des Orchidées.* Brussels.
Lyon Horticole.* Viviand-Morel. *S.-M.;* 8 francs. Lyons.
Moniteur d' Horticulture.* Lucien Chauré. *S.-M.;* 6 francs. Paris.
Moniteur d' Horticulture, Arboriculture, etc. Paris.
Orchidophile.* A. Godefroy-Lebeuf· *M.;* 2 francs, 50c. Paris.
Organe du Centre Horticole.* Charles Bloeykens. *S.-M.* Meirelbeke-lez-Gand. Belgium.
Progrés Agricole et Viticole.* L. Degrully. *W.;* 12 francs. Montpellier.
Revue Horticole.* E. A. Carrière. *S.-M.;* 20 francs. Paris.
Revue de d'Horticulture Belge.* Èd. Pynaert. *M.* Brussels.
Revue Horticole and Viticole.* E. Vancher. *M.;* 8 francs. Geneva. Switzerland.
Revue Vinicole. Paris.

IN GERMAN.

Deutsche Gärten-Zeitung. Leipzig.
Deutscher Garten. Berlin.
Deutcher Garten-Kalender. Berlin.
Deutsches Magazin für Garten-und Blumenkunde. Stuttgart.
Freyhoff's Garten-und Ackerbau-Zeitung. Oranienburg.
Fruchtgarten.* Chr. Ilsemann. *M.;* 3 Florins. Vienna.
Gärtner. Berlin.
Garten-und Blumenfreund. Cassel.
Garten-und Blumenzeitung. *M.;* 15 Marks. Hamburg.
Gartenflora.* L. Wittmack. *M.;* 20 Marks. Berlin.
Hamburger Garten-und Blumen-Zeitung. Hamburg.
Illustrirte Garten-Zeitung. Stuttgart.
Illustrite Praktische Blätter.* W. Richter. *S.-M.;* 3 florins. Vienna.
Journal für Landwirtschaft.* G. Liebscher. *Quart.;* 10 Marks. Berlin.
Monatsblatt für Gartenbau. Kiel.
Monatsschrift des Gartenbauvereins.* Rudolf Noack. *M.;* 2 Marks, 50 Darmstadt.
Monatschrift für Kakteenkunde.* Dr. Paul Arendt. *M.;* 2 Marks. Berlin-Friedenau.
Monatsschrift für Obst und Weinbau. Frauenfeld.
Nachrichten aus dem Gebiete des Gartenbaus, der Landwirthschaft, Fisherei und Jagd. Vilshofen und Hacklberg.
Obstbau.* Karl Gussman. *M.;* 6 Marks. Stuttgart.
Obstgarten. Klosterneuburg, bei Wien.
Obstmarkt. Berlin.
Pomologische Monatschefte. Stuttgart.

Praktische Obstzüchter. Klosterneuburg bei Wein.
Praktische Ratgeber im Obst-und Gartenbau.* Johannes Böttner. *W.;* 4 Marks. Frankfurt a. O.
Rheinische Blätter für Obst-Wein-und Gartenbau. Strassburg.
Rheinische Gartenschrift. Carlsruhe. Vereinigte Frauendörfer Blätter. Frauendorf.
Rosen-Zeitung.* P. Lambert. *M.;* 4 Marks. Trier a. Mosel.
Schleswig-Holsteinische Zeitschrift für Obst-und Gartenbau*. *M.;* 1 Mark. Kiel.
Schweizerische Zeitschrift für Obst-und Weinbau. Dr. Müller-Thurgau. *S.-M.;* 5 Marks. Wädensweil.
Traube.* Curt Weigelt. *M.;* 2 Marks. Berlin.
Wiener Illustrirte Garten-Zeitung.* Dr. G. R. Beck von Mannagetta. *M.;* 16 Marks. Vienna.
Zeitschrift für Obst-und Gartenbau. Leipzig.
Zeitschrift für bildende Gartenkunst.* Karl Hampel. *S.-M.;* 10 Marks. Berlin.

IN ITALIAN. SPANISH, PORTUGUESE.

Bulletino della R. Societa Toscana de Horticultura.* *M.;* 10 Lire. Florence, Italy.
Frutta e Vino. Milan.
Giardini. Milan.
Gardiniene. Milan.
Journal de Horticultura Pratica.* Eduardo Sequeira. *M.;* 13 Francs. Oporto, Portugal.
Orticultura Genovese. Genoa.
O' Floricultor. Oporto.
Revista de Horticultura. Rio de Janeiro.
Revista orticola. Pallanza.

MISCELLANEOUS.

Dansk Havetidende. Copenhagen.
Gyümöleskiztesz és Konyhakertészeti Füzetek.* Budapest.
Gartner-Tidende. L. Helweg. *W.;* 6 Kroner. Copenhagen.
Het Neederlandsche Tuinbowblad * Hugo de Vries. *W.;* 5 Francs. Amsterdam.
Journal of the Board of Viticulture. Victoria, Australia.
Kertészeti Füzetek. Budapest.
Russkoe Sadovodstvo.* A. K. Grell. *W.;* 4 Roubles. Moscow.
Sempervirens.* ; Gronewegen. Amsterdam.
Tidning För Trädgardsodlare.* Erik Lindgren. *M.;* 2 kroner, 50 öre. Stockholm.

§ 11. *Tools and Conveniences of the Year.*

VARIOUS DEVICES FOR FACILITATING HORTICULTURAL LABOR WHICH HAVE BEEN INVENTED OR FIRST PROMINENTLY MENTIONED IN 1891.

[None of the devices here described are in any manner recommended by the Editor.]

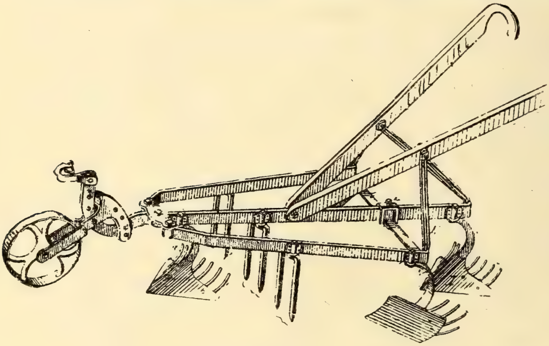


FIG. 1

COMBINED CULTIVATOR AND FINGER-WEEDER.—(Fig. 1.) This instrument is designed to combine the advantages of a cultivator and weeder by the use of the finger-teeth. "The design is wrong," the editor of the *Rural New-Yorker* thinks, "because the rods are too heavy and stiff. They will simply plow through the soil, when they should be limber enough to 'give' and slide over obstacles. The machine is patented."—*Rural New-Yorker, 73.*

HOME-MADE WHEEL-HOE.—(FIG. 2.) This is made from cast-off plow-handles and any old flat-tired wheel. The knife is made of hoop-iron. It is a good scraper or scarifier for garden crops.—*Home and Farm; reported in Popular Gardening, 178, 179.*

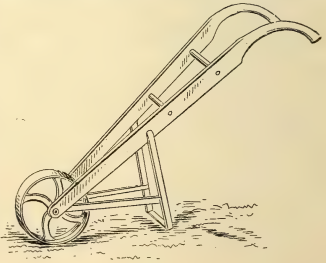


FIG. 2.

A WHEEL MARKER AND DIBBLE.—(FIG. 3.) A simple and useful device, made from a cylindrical stick of hard timber, which both marks the rows and makes holes for the plants.—*Farm and Fireside; reported in Popular Gardening, 201.*

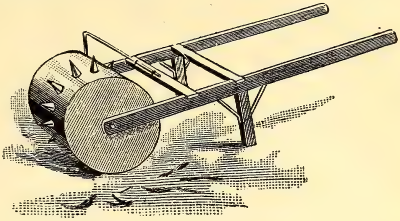


FIG. 3.

PRONGED-HOE. — (FIG. 4.) A strong pronged or "grape" hoe for various uses in grubbing.—*Popular Gardening, 258.*

STRAWBERRY-HOE.—(Fig. 5.) A hoe and runner-knife made from the leaf of a buggy-spring. The blade is about 10 inches long. "The upper part of the blade is bent at an opposite angle from the lower or hoe part of the blade. In other words, the lower part stands towards you and the upper part from you."—*A. A. Coon, in Popular Gardening, 231.*

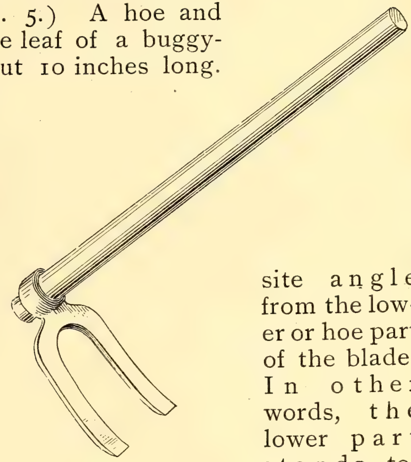


FIG. 4.

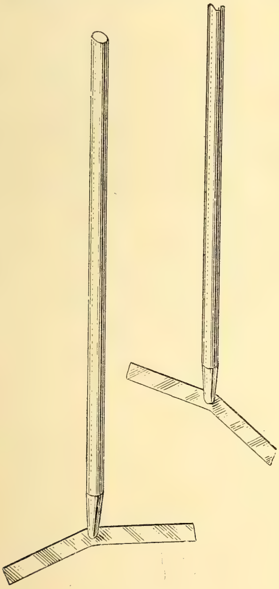


FIG. 5.

MRS. TARRYER'S TOOLS.—(Fig. 6.) A collection of tools, chiefly for the extermination of small weeds, which the readers of the *American Garden* will recall. (See ANNALS for 1890, 250.)—*American Garden, 441.*

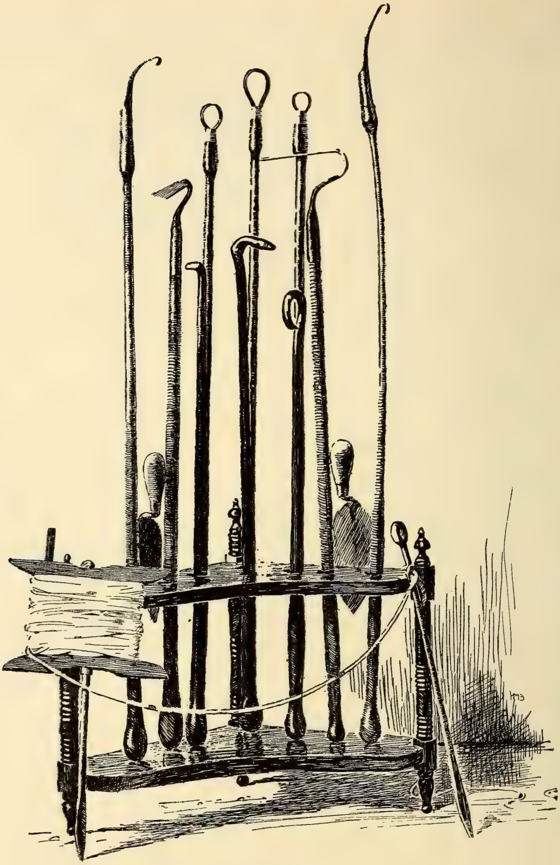


Fig. 6.

Home-Made Weeding-Hoe.—(Fig. 7.) Made from a piece of a broken wagon-seat spring. The shank is a broken pitchfork tine. "The hoe part is 7 inches one way by 1¾ inches the other, flat on the bottom, the bevel being on the top side, with the straight side forward, and sharp all around. It is essential that the points should be carried out, as they are important in slipping betwixt a weed and a plant."—*Thomas Buckman, in Farm and Fireside; reported in Popular Gardening, 223.*

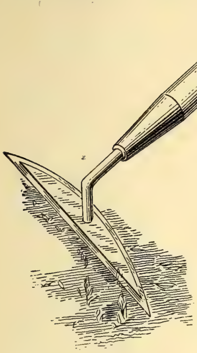


FIG. 7

HOE-HANDLE ATTACHMENT.—(Fig. 8.) A block of wood to be nailed on to the under side of a hoe-handle to enable the hand to obtain a better hold. Secure one at the end of the handle and the other about 18 inches below it.—*Gleanings in Bee-Culture; reported in Popular Gardening, 159.*

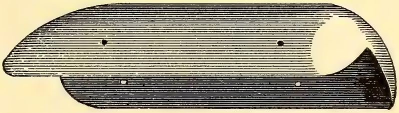


FIG. 8.

SOD-KNIFE OR FORK.—(Fig. 9.) An implement for loosening sod which has become "bound."—*Rural New-Yorker, 421.*

HOME-MADE WEEDER.—(Fig. 10.) Shows a good weeder made from discarded mowing-machine knives.—*Popular Gardening, 207.*

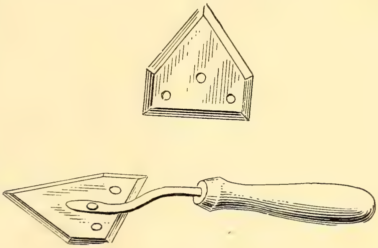


FIG. 9.

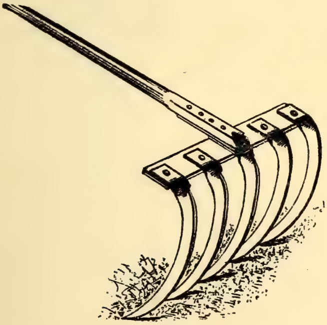


FIG. 10.

HANDY DIBBLE.—(Fig. 11.) Whittled from a branched stick. A piece of rubber hose is slipped over the handle to afford a better grasp of the hand.—*W. W., in American Garden*, 682, 683.

POT DIBBLE.—(Fig. 12.) A turned or shaved hard-wood dibble, 6 inches in diameter at the base, secured to an old spade-handle (*a*). For plunging a small pot, it is thrust part

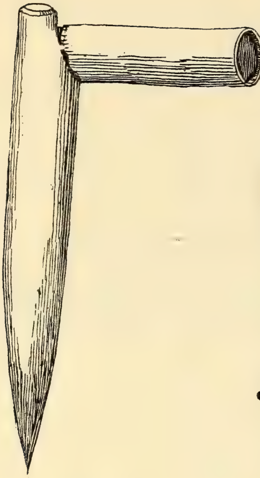


FIG. 11.

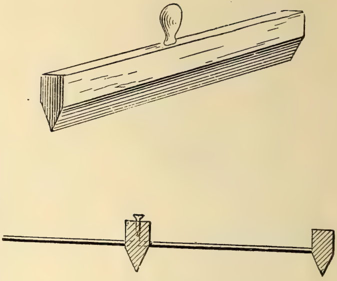
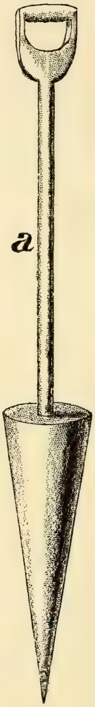


FIG. 13.



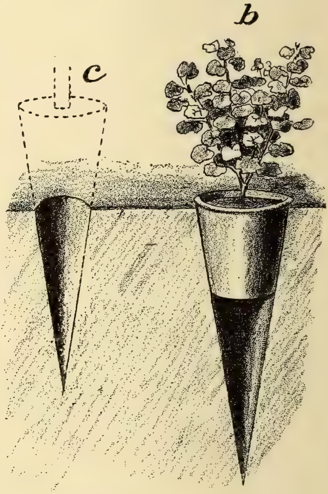


FIG. 12.

way into the earth (*c*). A 6-inch pot is plunged at *b*.—*C. C. Warlander, in Popular Gardening, 167.*

HAND-MARKER.—(Fig. 13.) "Take a piece of board 1 inch thick and 2 inches wide, and of any desired length; draw a line down the center of each side and one edge, and with a plane or sharp knife pare it down to a sharp edge; fasten a handle of convenient size and length at center of strip on the upper edge, and the device is complete. Grasp the handle firmly, press the sharp edge into the earth and you have a straight, even drill of uniform depth for sowing."—*D. M. Farnsworth, in Popular Gardening, 192, 193.*

Garden Reel.—(Fig. 14.) This represents a reel which has been patented by Peter Berntgen, of Cologne, Germany. The advantages claimed for it are: It can be driven easily and firmly into the soil; the line can be unwound easily and firmly fastened by means of the hook underneath; the line is strong and is knotted at regular intervals.—*Der Praktische Ratgeber im Obst-und-Gartenbau, 167.*

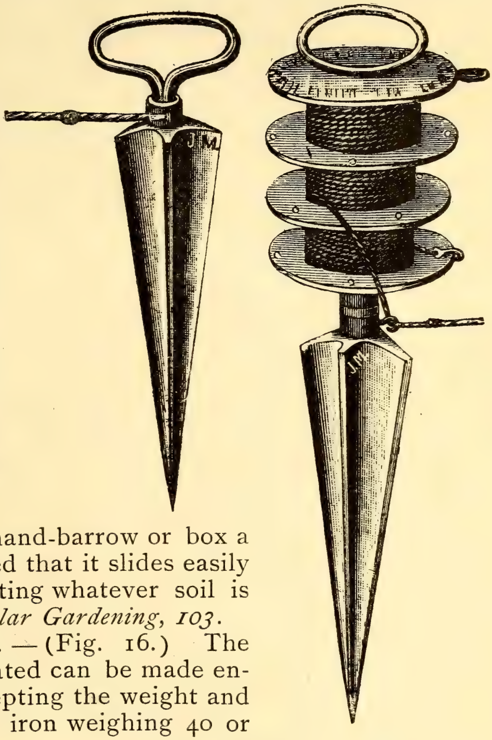


Fig. 14.

Riddling Soil.—(Fig. 15.) On a hand-barrow or box a sieve is so arranged that it slides easily back and forth, sifting whatever soil is placed in it.—*Popular Gardening, 103.*

A Post-Driver.—(Fig. 16.) The device here illustrated can be made entirely at home, excepting the weight and hook. A block of iron weighing 40 or 50 pounds is required. This you can have cast. Its essential features are a ring to hoist it by, and grooves in the sides in which to slide the tongues attached to the uprights. To have the dump self-acting, the hook must be made of the precise pattern shown.

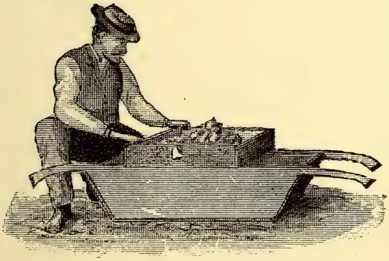


Fig. 15.

Any blacksmith can reproduce it. The hook is pulled down to the weight resting on top of the post, and slipped into its ring. As the weight is hoisted, the hook-ring will be seen to remain at the left-hand end of the slot, as shown. When it has reached the height at which it is desired to drop the weight, the long tongue of the hook trips against a rod or slat extended across the frame for the purpose, and is pulled down. This act lets the weight slide to the left, and the hook-ring to the right in the slot (see right of picture). The weight is thus freed and falls heavily on the post. Thirteen-foot planks are firmly braced on the front ends of stone-boat planks, held together by irons and bolts eight feet from the ground so they will not interfere with posts being driven. When being drawn from one field or farm to another, the boat-planks are connected in front and behind by hooks made of heavy wire. This prevents their spreading. Two pulleys are made of double thicknesses of inch board. The grain of these boards is placed at right angles the one to the other, to prevent splitting. One is hung at the top of the upright, to receive the rope direct from the weight-hook, and the other at the rear end of the boat-planks on a brace. A horse draws the machine along astride the fence-row,

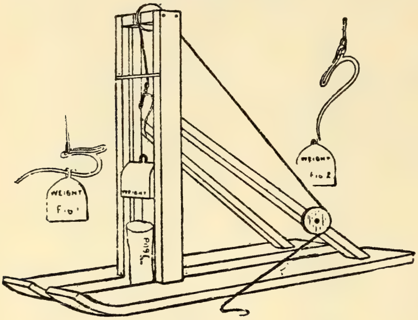


Fig. 16.

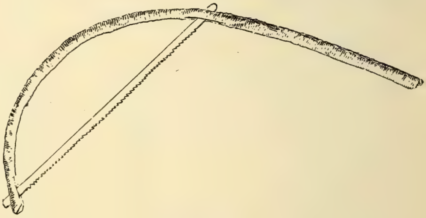


Fig. 17.

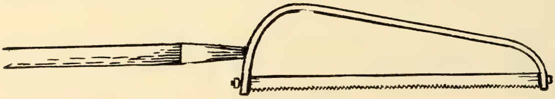


Fig. 18.

and the posts are held in place by the uprights while being driven. Any boy can raise the weight by pulling on the rope.''—*Home and Farm; reported in American Garden, 771.*

PRUNING-SAW.—(Fig. 17.) A saw-blade like that in the illustration can be purchased for 25 cents. Insert it in a bent frame.—*Popular Gardening, 159.*

PRUNING SAW.—(Fig. 18.) This saw-blade is about 22 inches long and an inch wide, with five or six teeth to the inch and filed so that it cuts but one way. It is set in a frame made of three-quarter inch oval iron, four or five inches wide at the base and tapering to two inches. A nut at the base allows of tightening the blade.—*C. E. Cook, in Rural New-Yorker, 282.*

PRUNING-KNIFE.—(Fig. 19.) This consists of a long shaft at one end of which is a handle, and at the other end is a curved blade. It is used for removing canes and branches of thorny plants.—*G. Schneider, in Der Praktische Ratgeber im Obst- und-Gartenbau, 28.*

PRUNING-SHEARS.—(Fig. 20.) The illustration shows a pair of home-made shears, both open and shut. These shears cut upon both motions, that is, both in opening and closing.—*J. C. Woodruff, in Popular Gardening, 108.*

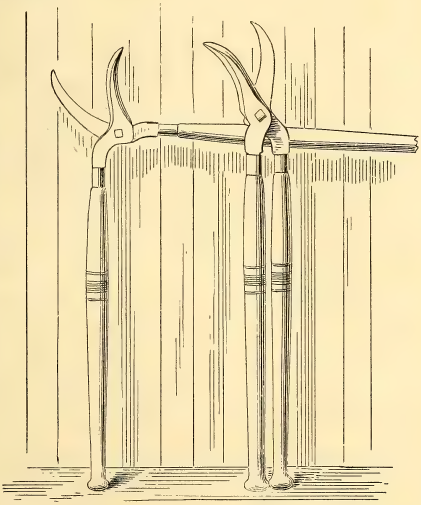


FIG. 20.

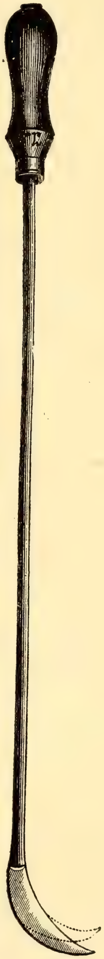


FIG. 19.

STRAWBERRY-PLANTER.—(Fig. 21.) "This is made of a 2-inch pine plank, 6x8 inches, made into a perfect wedge and covered on two sides with a strip of tin 6x16 inches. A piece of ¾-inch board, 4x8 inches, is nailed on the thick end, projecting an inch on all sides. A little on one side from the center a hole is bored, into which the handle is firmly screwed. The latter is an iron rod 3½ feet long."—*J. H. Salisbury, in Popular Gardening, 151.*

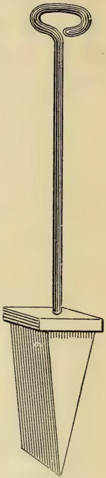


FIG. 21

HAND-BARROW.—(Fig. 22.) The hand-barrow is "arranged for carrying three crates (of strawberries) if necessary or about 180 pounds. The side pieces are of light but strong material, 4 inches wide and 1½ inches thick and 7 feet long. Handles are worked on each end and the two pieces connected by two cross-pieces framed in, about 3 feet apart or justright to hold three crates, placed crosswise, making the barrow 2 feet wide, inside measure."—*L. B. Pierce, in Popular Gardening, 88.*

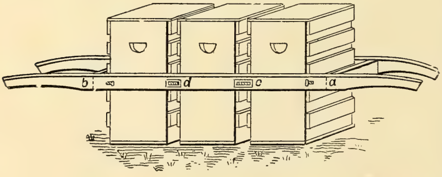


FIG. 22.

MACHINE FOR MOVING LARGE TREES.—(Figs. 23, 24.) "The machine consists of a hind axle, 12 feet long, and broad-tired wheels that will not cut up a lawn or sink into the soft soil about the holes. The main frame is made of spruce 3x8 inches and 20 feet long; the frames in the cuts are only 16 feet in length, which was not sufficient, as the earth thrown out from the hole into which the tree was to be planted interfered with the free movement of the machine till I made it longer. The braces are 3x5 inches and 10 feet long, and the uprights 3x9 inches and 3 feet high; these are bolted to the hind axle and main frame. The front axle has a set of blocks bolted together, and of sufficient height to support the front end of the frame. Into the top timbers, 3x6 inches, hollows are cut at the proper distances to receive the ends of two locust rollers. Holes can be bored through the rollers and large ropes from the roots can be made fast to them and by the means of crowbars they can be wound up and the tree lifted. I abandoned the plan, however, and put a windlass or winch at each end of the frame, and now I can easily and steadily lift and lower the tree, the large doube ropes passing over the rollers to the windlasses. A locust boom is put across the machine under the frame and above the braces; iron pins hold it in place. The side guy-ropes are made fast to the ends of this boom. The other guy-ropes are made fast to the front and rear parts of the machine. Four rope loops are made fast inside of the frame and are so placed that by passing a rope around the trunk of the tree and through these loops two or three times, a rope ring is made around the tree that will keep the trunk in the middle of the frame and not allow it to hit either the edges or the rollers—a very neces-

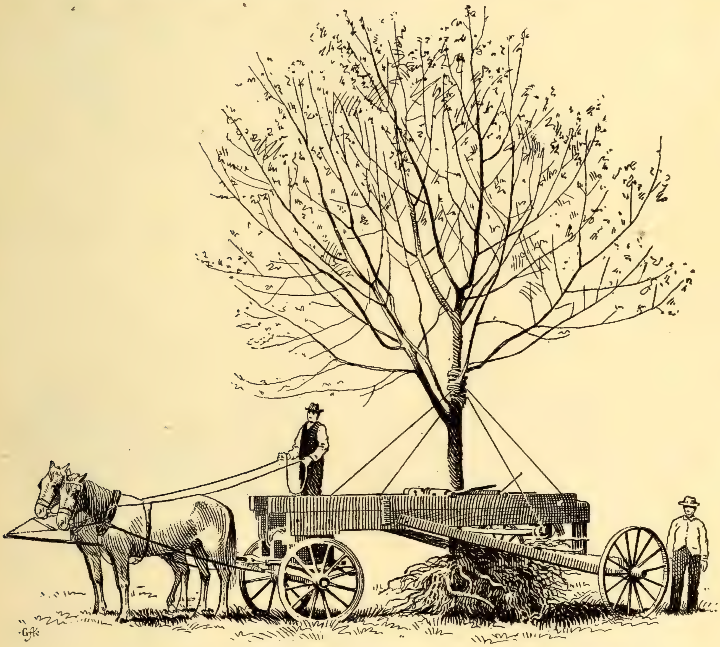


FIG. 23.

sary safeguard to prevent injury. As the tree is slowly lifted by the windlasses the guy-ropes are loosened as needed. The tree will pass obstructions, such as trees by the roadside, but in doing so it is better to lean the tree backward.

When the tree has arrived at its new place, the two timbers are placed along the opposite edges of the hole so that the hind wheels can be backed over the latter. The tree is then lowered to the proper depth and made plumb by the guy-ropes, and good mellow soil is thrown in and packed well into all the cavities under the rolls. When the hole is half filled, several barrels of water should be poured in; this will wash the soil into the cavities under the center of the tree.—*Edward Hicks, in Rural New-Yorker, 749.*

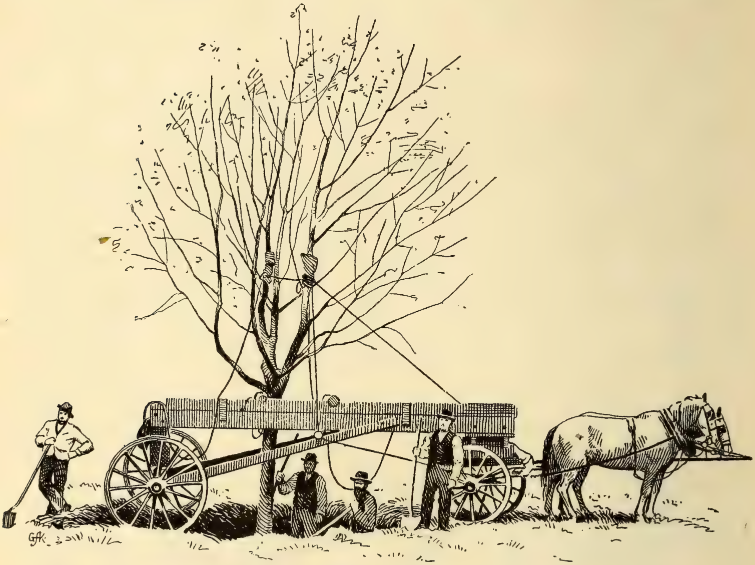


FIG. 24.

LAWN-MOWER FIXTURE.—(Fig. 25.) An English patented device for adjusting the cylinders of lawn-mowers, by the Messrs. Ransomes, of Ipswich. "A strong spring under the bearings on each side supports the cylinder and takes the place of a bottom set-screw. One set-screw working against the spring is fixed above the brasses in which the cylinder turns. The operator has only to set this one screw on each side of the machine to adjust the knives.'' —*Gardeners' Magazine, 295.*

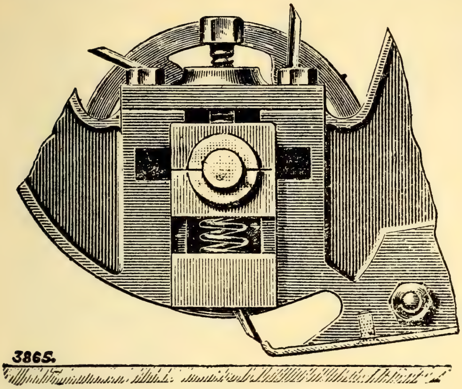


Fig. 25.

Improved Lawn-Cleaner.—(Fig. 26.) ''The illustration represents a machine designed effectually to clear grass, leaves, etc., from lawns and similar places, and which will take up the grass cut by a lawn-mower, leaving the lawn perfectly clean. It has been lately patented by Charles Bailey, Winnepeg, Canada. The frame of the machine is preferably made of bar-iron, and in its side-bars, near the rear, is journaled a shaft on which the drive-wheels are keyed. On this shaft, near one of the wheels, is loosely mounted a groove-pulley, having a toothed periphery contiguous to the drive-wheel. This toothed periphery is engaged by pawls pivoted upon the drive-wheel when the machine is moved forward, thus revolving the pulley, but when the ma-

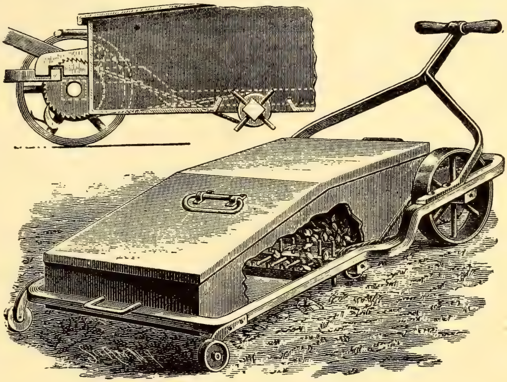


Fig. 26.

chine is drawn backward the pawls slip over the teeth. Near the center of the frame is journaled a rake-head, with teeth projecting at right angles from its sides, as shown in the small view, one end of the rake-head having rigidly attached thereto a small pulley connected by a belt with the pulley on the drive-wheel shaft. As the refuse is thrown upward by the rake when the machine advances, it is received in a box-like receptacle provided with a detachable cover, this receptacle neatly fitting within the frame of the machine, and having a transverse bottom opening within which the rake revolves. When the box has been filled with grass, leaves, etc., it may be lifted from the frame, the cover removed, its contents emptied, and the receptacle again replaced without trouble."—*Scientific American; reported in American Garden, 703.*

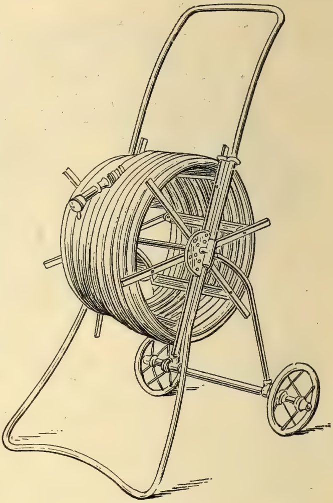


FIG. 27.

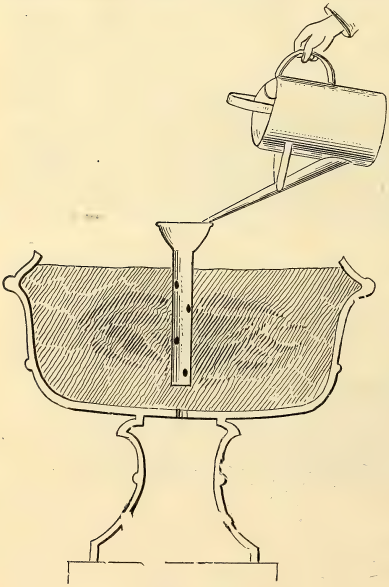


FIG. 28.

HOSE-TRUCK.—(Fig. 27.) A neat device for carrying hose is shown in the figure. It is made of ordinary gas-pipe. —*Popular Gardening, 196.*

VASE-WATERING DEVICE. —(Fig. 28.) This is a simple tin or iron punctured tube with a funnel top, the use of which is obvious from the cut.—*Popular Gardening, 254, 255.*

POTATO-SCOOP.--(Fig. 29.) A handy scoop made by Bissell & Thornhill, Melford, Mich. It can also be used as a potato-sorter.--*Rural New-Yorker, 373.*

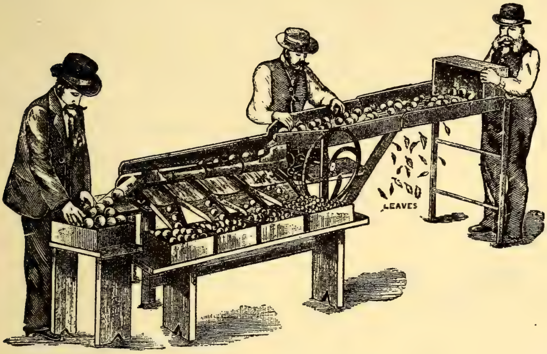


FIG. 30

FRUIT-SORTER.—(Fig. 30.) The illustration shows a California machine for sorting oranges and other fruits. (See ANNALS for 1889, 183; and ANNALS for 1890, 257, for other sorters.)—*Rural New-Yorker, 421.*

ORANGE-SORTER.—(Fig. 31.) Shows one of the many fruit and potato-sorters now upon the market or devised by ingenious growers.—*Popular Gardening, 215.*

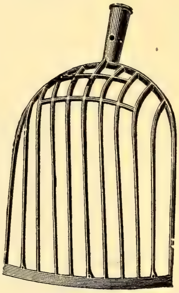


FIG. 29.

INGENIOUS FRUIT-PICKING CONTRIVANCE.—An ingenious fruit-picking contrivance has been invented by Edward D. Stodder, of San Francisco. It is a light, double, wheelbarrow-ladder, which can be folded up or elevated at any angle at will. An

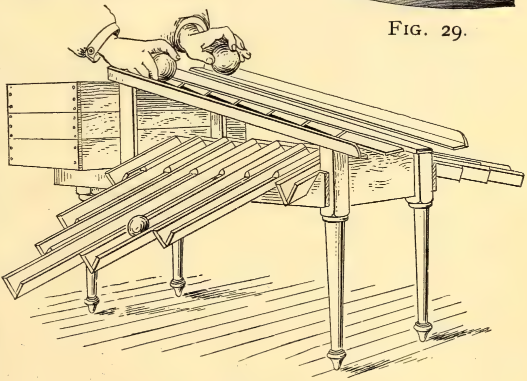


FIG. 31.

endless belt, with double pockets, like those of a grain-elevator, conveys the fruit to the ground and automatically dumps it into the boxes, doing away with the necessity of the picker's leaving the ladder for any other reason than that of changing its location. A number of the ladders will be put into orchards the coming season by the inventor to demonstrate their usefulness.—*California Fruit-Grower.*

FRUIT-NIPPERS.—(Fig. 32.) The latest device for providing a stout and sharp substitute for the thumb-nail here illustrated is only a short, thick pair of shears made to fit between the thumb and forefinger. This effort to save the thumb is a commendable one.—*Rural New-Yorker, 661 ; American Garden, 703.*

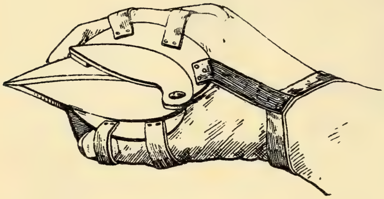


FIG. 32.

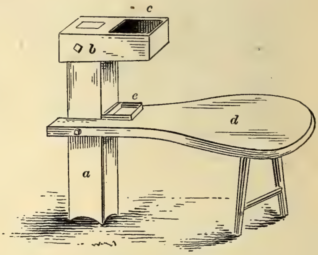


FIG. 34.

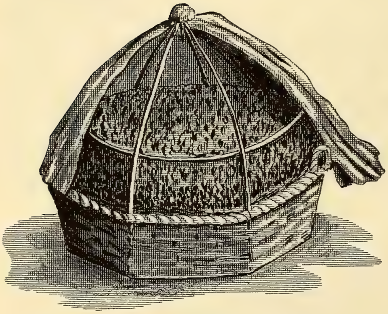


FIG. 33.

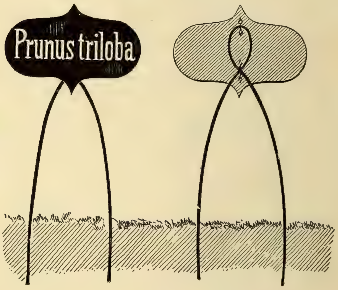


FIG. 35.

PACKING PLANTS.- (Fig. 33.) This is a European device for carrying live plants long distances. The engraving was made from a basket 12 inches high and four feet across. Tough bows of green wood formed the framework of the cover. Matting covered the whole.—*Popular Gardening, 69.*

BASKET-FRAME.—(Fig. 34.) A device to facilitate the

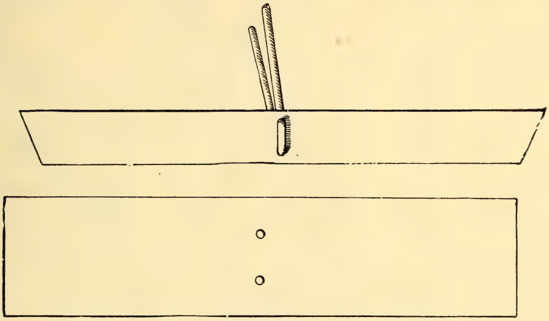


FIG. 36.

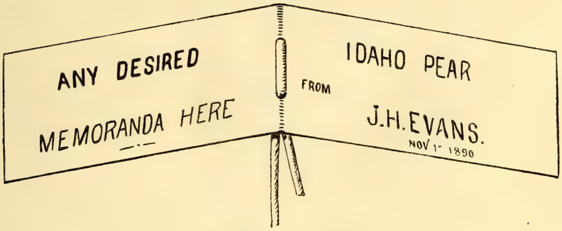

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FIG. 37.

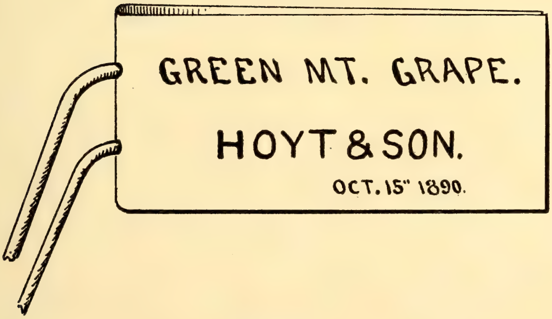
GREEN MT. GRAPE.
HOYT & SON.
OCT. 15" 1890.

FIG. 38

nailing up of berry-boxes. "Upon a standard, *a*, which is a piece of scantling 2½ feet long, another piece 9 inches long, *b*, is morticed and bolted. An iron plate, *c*, ¼-inch thick, screwed upon *b*, serves a good purpose in clinching nails.

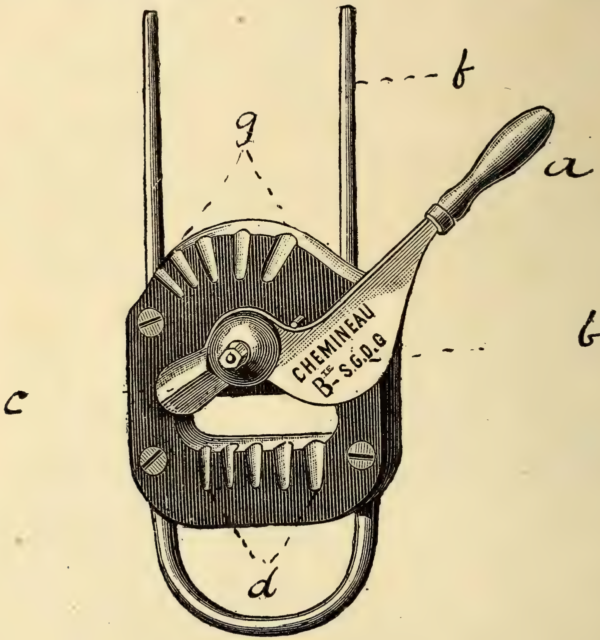

FIG. 39.

The seat, *d*, is 2¾ feet long and made of 2-inch plank 1 foot wide."—*Geo. G. Jones, in Popular Gardening, 165.*

LABEL FOR LOW PLANTS.—(Fig. 35.) The illustration shows a German device for labeling low plants. The label is made of zinc. The face is given a couple of coats of black paint upon which, when dry, the name is written with a stub pen or brush, in paint made of white lead and rectified varnish.—*Pupular Gardening, 133.*

RURAL NEW-YORKER LABEL.—(Figs. 36, 37, 38.) Pieces of zinc, as in fig. 36, are secured by wire at the middle. The names or memoranda are written upon all four faces, or at least upon the inside and outside faces. Fig. 37 shows a good form of memoranda. The label is folded or doubled together as in fig. 38. The outside record lasts a year or two; when that is effaced, open the label and the inside will be found to be bright. (See ANNALS for 1890, 267.)—*Rural New-Yorker*, 102.

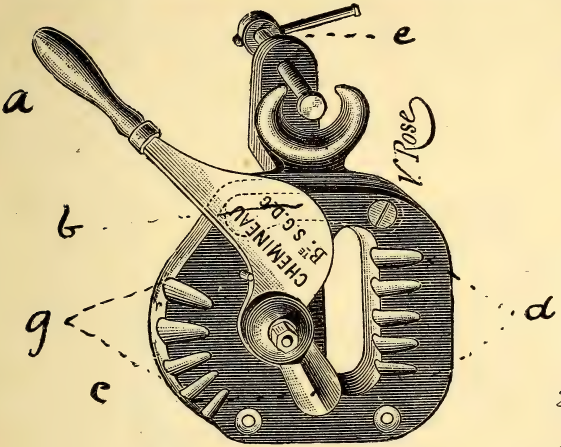

FIG. 40.

GRAFTING-MACHINE.— (Figs. 39, 40.) The piece to be cut is placed in the grooves (*d*, fig. 39) which are of different sizes. By turning the handle (*a*, fig. 40) to the right, the blade, *b*, makes the first cut; the piece is then changed to the other set of grooves, *g*; and the second cut for the insertion of the tongue is made by the blade, *c*, when the handle is

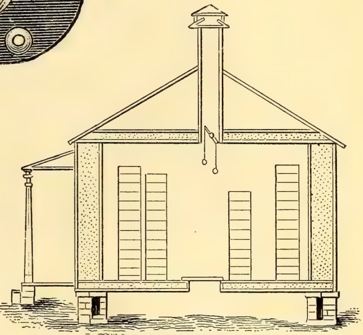

FIG. 42.

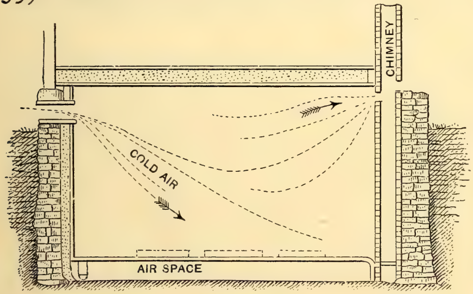

FIG. 41.

returned to its original position. Fig. 40 shows a vice, *e*, by which the machine may be fastened to a table; Fig. 39 shows an arrangement, *f*, for grafting in the field.—*L. Degrully, in Le Progres Agricole, 250.*

FRUIT-HOUSES.—(Figs. 41, 42.) These two cross-sections illustrate at a glance how the movements of air can be utilized in the cooling of storage-houses. Fig. 41 shows a pit or cellar room. The other is built upon the surfaces. The walls contain air-spaces.—*Country Gentleman; reported in Popular Gardening, 245.*

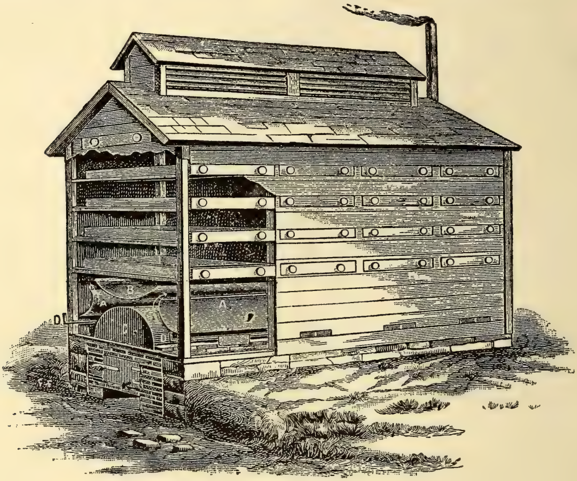

FIG. 43.

CHEAP EVAPORATOR.—(Fig. 43.) "It is built of wood. All the frame required is the upright, 2x2-inch posts and 2x3-inch horizontal drawer-rests. The drawer-rests are placed flatwise and between the posts, rabbeted one-half inch on each side to receive the drawers. The sides and back of the drawers are 1½ inches wide; the front is 2 inches wide, with a ½-inch rabbet above and below, on the inside, and there are corresponding rabbets on the siding of the house, so that when the drawers are pushed in, the outside surface will be smooth. The bottoms of the drawers are made of galvanized wire cloth. There is a false front to each drawer, three inches back. The upright posts are two and one-half feet apart. The drawers are 3¾ feet long, and with the false front, three inches back; this gives a three-inch space at each end of the drawers for free circulation of air. The end drawers are four inches deep and five feet long and are used to finish on. Have four extra drawers and have some extra front pieces to put in and close up the openings when the drawers are out. The sheet-iron fenders, A B, extend the whole length, to distribute the hot and cold air. The cold air enters the ventilators below A, and is divided by B. The arch C is sheet iron with a 2-inch flange resting on the wall of the furnace, which is two feet high and two feet wide, laid in mortar. The top course of brick is laid in mortar on the flange, to prevent the escape of smoke. The building is 10½ feet long, 7 feet high and 4 feet wide. DD are connecting-rods attached to the ventilators. The furnace can be built below the surface on sloping ground. The amount of heat is great, and the thing to be observed closely is to admit plenty of cold air through the ventilators."—*J. W. Beach, in Farm and Fireside; reported in Popular Gardening, 245.*

BLACKBERRY-TRELLIS.—(Fig. 44.) "My plan is to take good fence-posts, five feet in length, set one at each end of a row, 3⅓ feet in the ground, leaving twenty inches above ground. I use No. 12 galvanized wire and draw it as tightly as possible. However long the rows may be, a post set firmly at each end is sufficient. After the canes are tied to the wire they form a perfect support, and there are no stakes in the way of the hoe. I top my canes at three feet, just the right height to be handy for the pickers. By running the wires 20 inches from the ground they pass below the branches, so that it is much more convenient to tie them, and less twine is required, while the tops are in better shape for picking."—*E. A. Trout, in Rural New-Yorker, 243.*

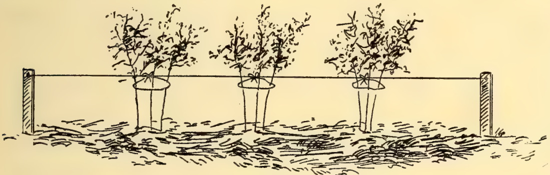

FIG. 44.

CELERY-BLANCHER.—(Fig. 45.) A patented device which consists of oiled paper or cloth fitted with loops or hooks and held in place by stakes thrust into the ground. —*Rural New-Yorker*, *373*.

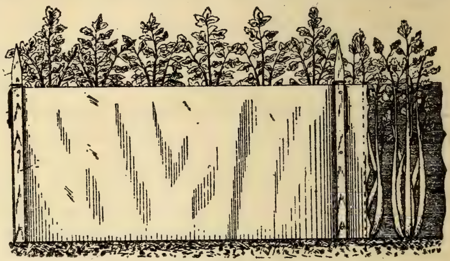

FIG. 45.

HILLING CELERY.—(Fig. 46.) Instead of holding the celery with the hands until it is banked, it was found that paper string—which soon rots—could be used. "We put it on several thousand plants and found that very little injury was done, and this happened by the careless putting on of the string. The plants were held in position by the string until a rain came and settled the dirt around the plants and wet the string enough so it would give way to the growing plant. Some of the plants we gave a second banking before the string gave way and let the plant spread. We invented a little device for putting the string on. I took a tomato-can and punched a hole through the bottom of it, nailed it to a stick, and then with a piece of pantaloons' suspender, with the buckles, fastened it to the right arm

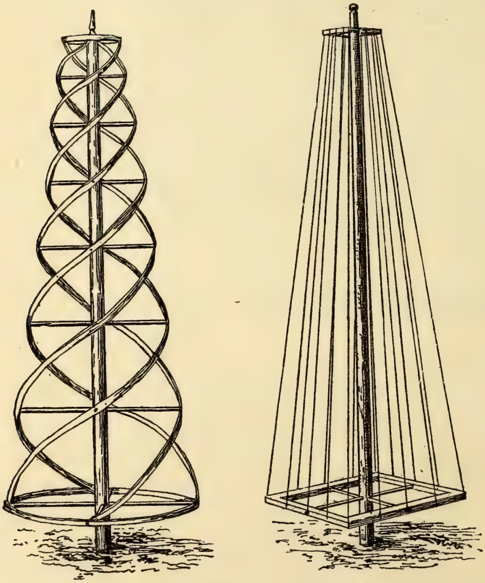

FIG. 47.

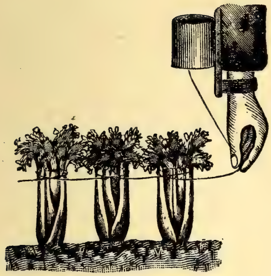

FIG. 46.

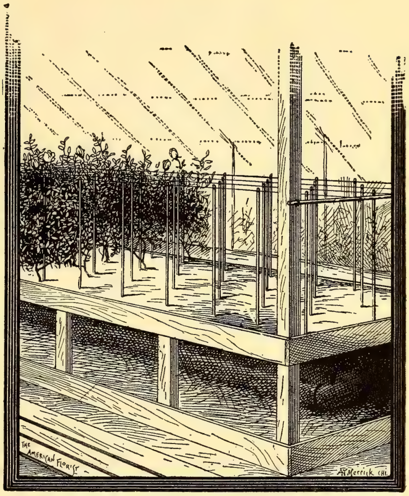
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FIG. 49.

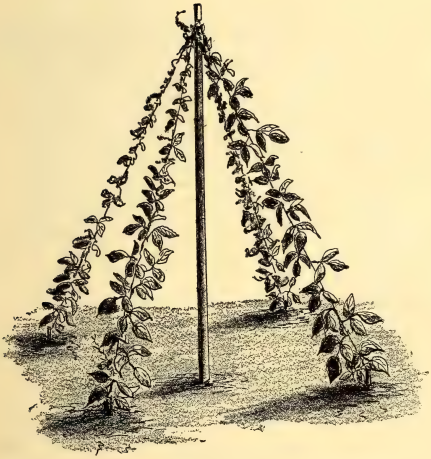


FIG. 48.

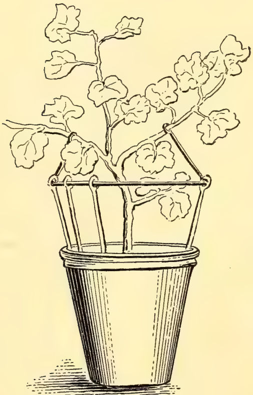


FIG. 50.

above the elbow and at the wrist, letting the string run out at the bottom of the can and between the thumb and front finger. With this one can wind celery all day, if his back does not get to aching too badly. This is all the drawback I have found to it yet.''—*M. J. Green, in Ohio Farmer ; American Garden, 704.*

Trellises.—(Fig. 47.) Good trellises made of hoops and strings, as shown in the cut.—*Geo. B. Diemer, in Popular Gardening, 173.*

Poling Beans.—Fig. 48 shows a method of training four hills of beans to a single pole. —*Popular Gardening, 187.*

Method of Staking Roses.—(Fig. 49.) "I stretch a heavy wire directly over each row of plants, 3½ feet above the surface of the soil, to which the top of each stake is fastened with a piece of fine wire.'' The stakes are four feet long, and they extend two inches above the wire.—*Edward Salyer, in American Florist, 146.*

Plant-Support. —Fig. 50 shows a simple and handy wire plant-support.—*Popular Gardening, 124.*

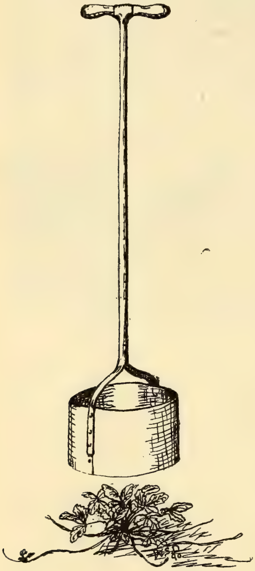


Fig. 51.

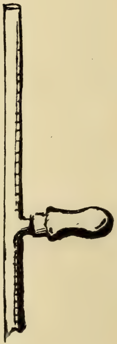


Fig. 52.

Strawberry-Plant Trimmer.—(Figs. 51, 52.) The trimmer is made of heavy sheet-iron 28 to 30 inches long and 6 inches wide. This makes a cylinder of about 9 inches in diameter. Instead of the cross-bar handle the form shown in fig. 52 may be used.—*E. W. Reid, before the Ohio Horticultural Society ; reported by U. S. Devol, in American Garden, 175.*

Iron Grape-Posts.—(Fig. 53.) Made of 1½-inch gas-pipe, 7 or 8 feet long. The top of the posts should be covered by a cap. They should be drawn to a closed point below to keep out moisture. Or iron bars might be used, as shown in the first two drawings.—*H. W. Smith, in American Garden, 309.*

RECEPTACLE FOR STARTING EARLY PLANTS.—(Figs. 54, 55.) This consists of long strips of sacking or any other cheap material, the sides of which are sewed together as shown in fig. 54. Pieces are cut from such rolls, they are filled with earth, and in them the seeds are sown. When transplanting, pots and all are set in the field. Fig. 55 shows the method of carrying or storing them in flats or trays.—*J. Miller, in Der Praktische Ratgeber im Obst-und Gartenbau, 68.*

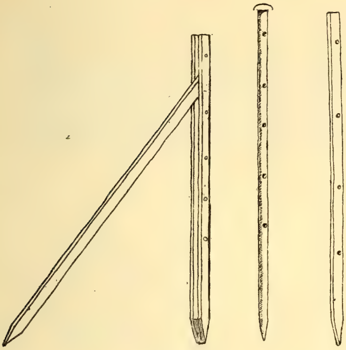


FIG. 53.

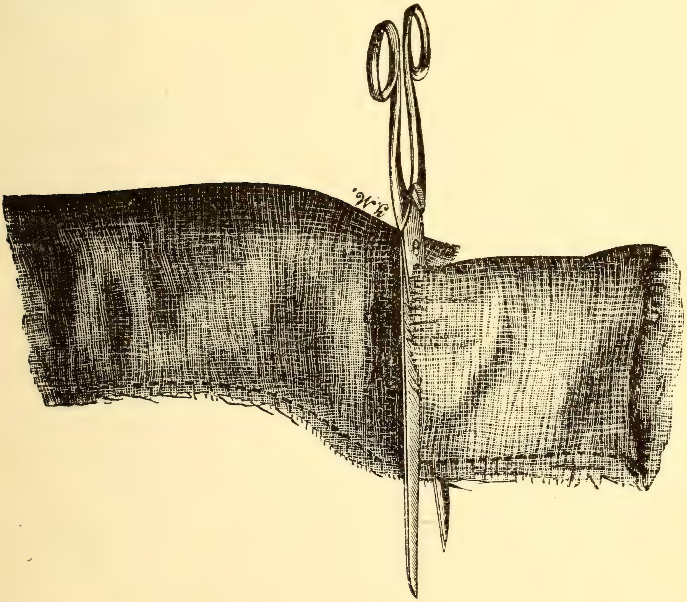


FIG. 54.

TOOL FOR PRICKING OUT PLANTS.—(Fig. 56.) This is made of wood, and is excellent for transplanting seedlings too small to handle with the fingers.—*W. Kruger, in Der Praktische Ratgeber im Obst-und Gartenbau, 103.*

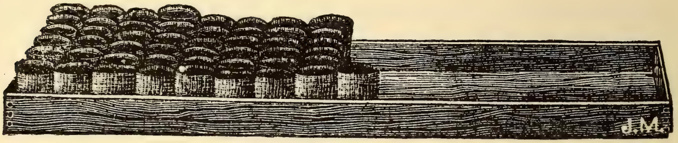


FIG. 55.

CUCUMBER-PLANT PROTECTOR.—(Fig. 57.) A screen to cover plants that are threatened by the striped-beetle. "It is made of ⅝-inch undressed pine lumber, covered over the

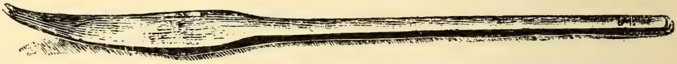


FIG. 56.

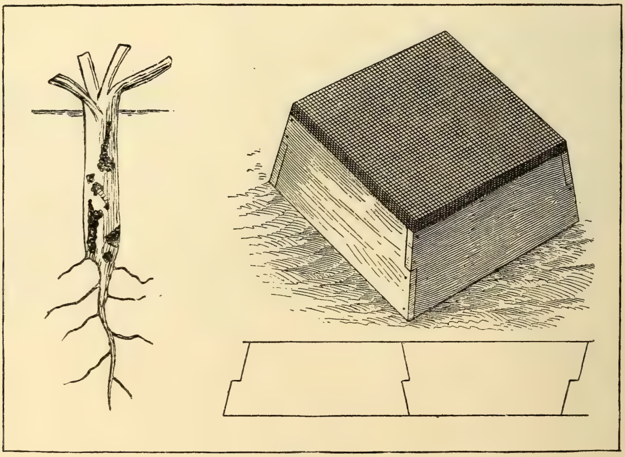


FIG. 57.

top with ordinary wire mosquito-netting. The frame may be made 16 inches square at the top, and the sections are cut so that the bottom is slightly larger, giving flare enough to admit of nesting the boxes together for convenient storage. By cutting the boards in the manner shown in the drawing, they may be 'double-nailed,' which greatly adds to the strength of the frame." An il-

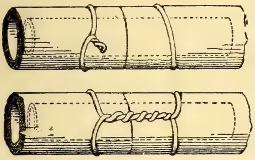


FIG. 58.

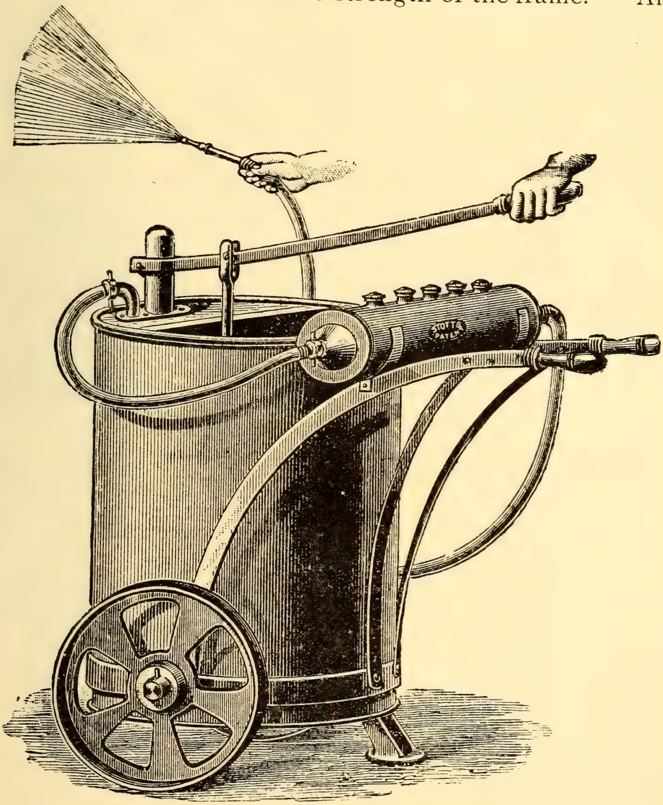


FIG. 59.

lustration of the injury wrought by the beetle is shown in the cut.—*Popular Gardening, 179; adapted from E. S. Goff, in Garden and Forest, iii. 91 (1890).*

Simple Hose-Mender.—(Fig. 58.) "After trimming evenly the ragged edges of the break in the hose, a short section of half-inch iron pipe is inserted as shown by dotted lines in the cut. Then a piece of galvanized iron is wrapped around the hose as shown at the right in the upper figure, and twisted tightly so as to sink into the rubber. The wire is then twisted for a few inches as shown in the lower figure, again wrapped around the hose and fastened as shown at the left of the upper figure. This mender is not patented, and the materials for making it are inexpensive and easily obtainable."—*John McGowan, in American Florist, vii. 107; American Garden, 705.*

Distributors for Insecticides.—(Figs. 59, 60, 61.) Fig. 59 shows Stott's patent distributor. The insecticide is contained in cells and is forced with the water through the hose. It can be fastened to engines and can be removed when desired. Figs. 60 and 61 represent a syringe which works on the same principle. A chamber at the end of the syringe contains the composition, and the nozzle is formed to distribute it in the form of spray to insect-infested plants.—*Journal of Horticulture, March 26, 250.*

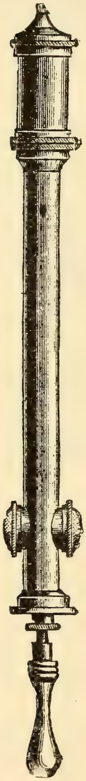


Fig. 60.

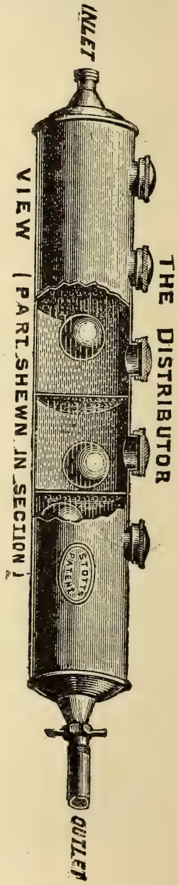


Fig. 61.

Contrivance for Applying Flowers of

Sulphur.—(Fig. 62.) The instrument ("Soufreur Vincennois") consists of a zinc tube at the base of which is an enlargement perforated on the under side. The sulphur is put in at the upper end of the tube, which is then closed by a cork.—*E. A. Carriere, in Revue Horticole, 227.*

Flower-Syringe. —(Fig. 63.) A fine spray is obtained by directing the solid stream from a syringe against a hard smooth surface as shown in the figure.—*G. Schaedtler, in Der Praktische Ratgeber im Obst-und Gartenbau, II.*

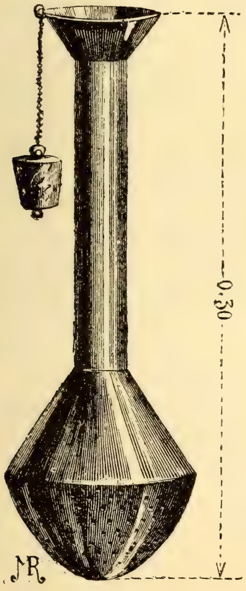


Fig. 62.

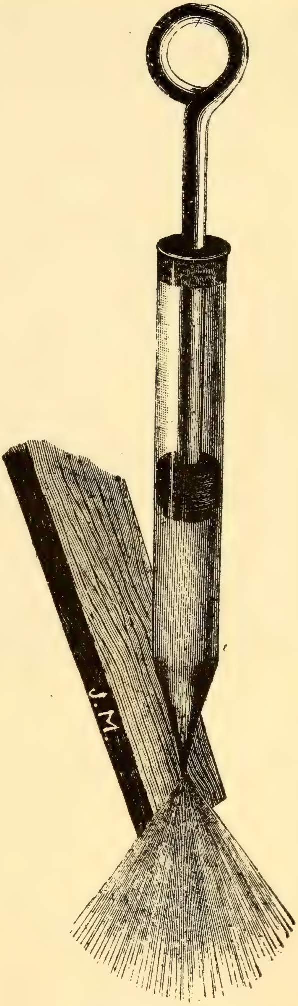


Fig. 63.

AN INSECT-TRAP.—(FIG. 64.) This consists of a barrel suspended from a tree. Both ends of the barrel are removed and underneath it is a tub partially filled with water. The insects are attracted by the light from a lantern which is hung in the center of the barrel, and are caught in the water below.—*Der Praktische Ratgeber im Obst- und Gartenbau, 141.*

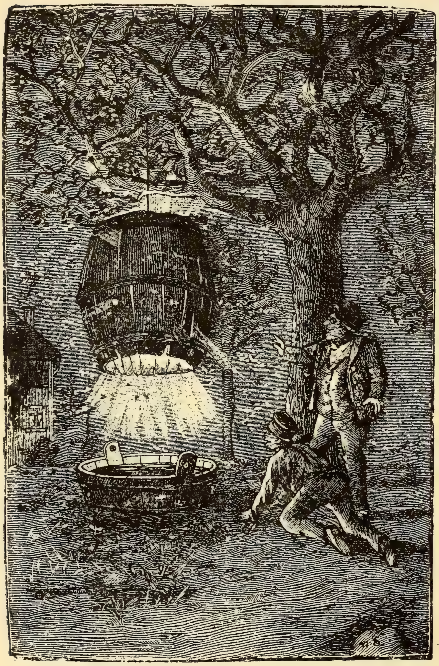


FIG. 64.

GREENHOUSE-BENCHES.—(Figs. 65, 66.) E. G. Hill's bench, Fig. 65, is made of light iron T-rails, such as are used on some street-car lines. The rails are held in place by notches in the framework or by strips cut to fit between them. The posts, cedar, are 8 or 12 feet apart. "The sideboard is held in position by galvanized iron strips which pass through two slits in the board and clasp around the outside rail." R. J. Mendenhall's bench (Fig. 66) is constructed with brick piers and 3x3 in. angle-iron. The piers are 8 feet apart.—*American Florist, vi. 983; Popular Gardening, 267.*

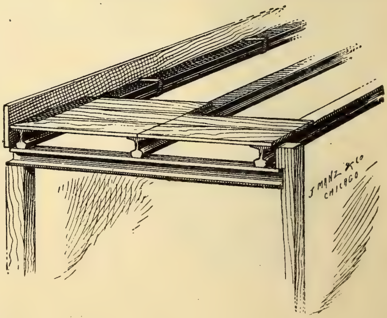


FIG. 65.

FLOWER-STAGE.—(Fig. 67.) This shows a simple and serviceable stage upon which to grow or exhibit plants.—*J. L. Masters, in Popular Gardening, 209.*

SASH-BARS.—(Figs. 68, 69.) Fig. 68 shows a cross-section of the eave-plate, A being the plate with a projection at its side to form a trough; B the rafter-plate, upon which the ends of the rafters and sash-bars rest; and C the point to which attention is called—a trough to catch the drip as it runs down the glass and sash-bars. This trough is made of white pine; 1x1½ inches. Fig. 69 shows drip-grooves in a sash-bar.—*C. J. Pennock, in American Florist, vii. 131.*

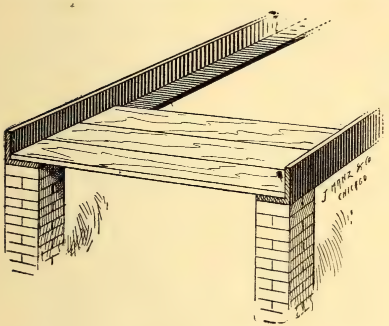


FIG. 66.

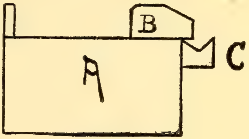


FIG. 68.

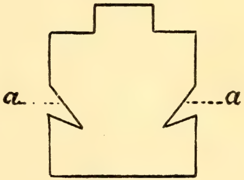


FIG. 69.

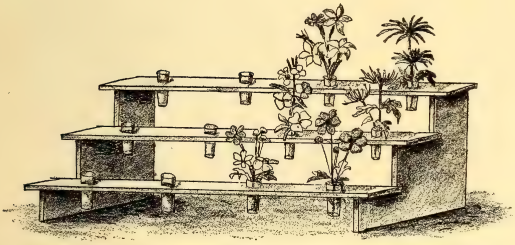


FIG. 67.

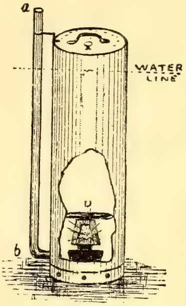
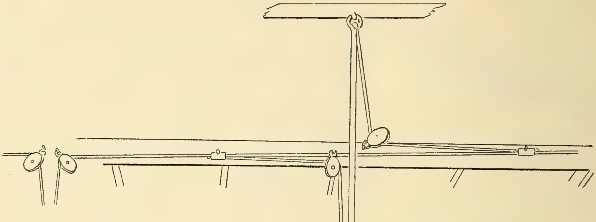


FIG. 71.

VENTILATING APPARATUS.—(Fig. 70.) "The winch comprises a 6-inch bull-wheel, a pinion of 1½ inches, a drum of 4 inches, a rachet and dog, and a 12-inch crank handle, set in a wrought iron frame bolted to the inside end of the house. This is found to be of sufficient power to operate 9 sashes on each side of a house 100x31 feet, amply sufficient for ventilation, and either side can be worked separately at will by the same winch.'' "By running an auxiliary cord back from sash to cable in the opposite direction to that of the lifting-cord,'' a lock is provided for the sash, whether they are open or closed. At Lincoln Park, Chicago, where this is used, $26 is the cost of the apparatus for a 100-feet house.—*American Florist, 803 ; also Popular Gardening, 223.*



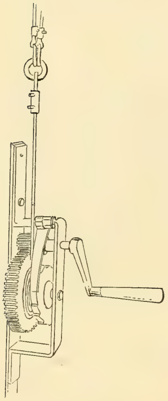


FIG. 70

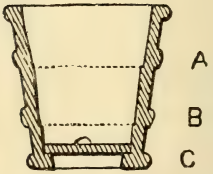


FIG. 74.

DEVICE FOR HEATING WATER.—(Fig. 71.) "A cheap way to warm a tank of water is shown in illustration. Assuming that the water-tank is 36 inches deep, get a tin pail as deep and 10 inches in diameter, made with a cover, in which an inch hole is put. Have an inch tube, *b*, two inches long, soldered on near the bottom and punched through, and to this tube attach an inch hose, *a*, or pipe, making a water-tight joint at *b*. Sink this tin pail in the tank, and by hooks or otherwise fasten it to the bottom so that it remains fixed. Have the hose, *a*, fastened to the side so as to be a little above the top of the pail. Fill the tank with water to the dotted line, and arrange so that it cannot fill more and submerge the pail. Now put a 50-cent oil stove, U, into the pail, with oil enough to run it one hour, and put it (lighted) into the bottom of the pail. Put on the pail-cover, and the water in the tank will soon be warm enough. It is best to have a cover for the tank that can be shut down and hold in the heat that escapes from the pail. The tube, *a*, supplies the air to keep the fire going. The fire, of course, goes out when the oil fails, and there can be no possible danger. A pint of oil, costing less than one cent, will warm a tank of water. The cost of this apparatus, all told, is: Pail, $1; stove, 50 cents; hose, 20 cents."—*Country Gentleman; reported in American Garden, 771.*

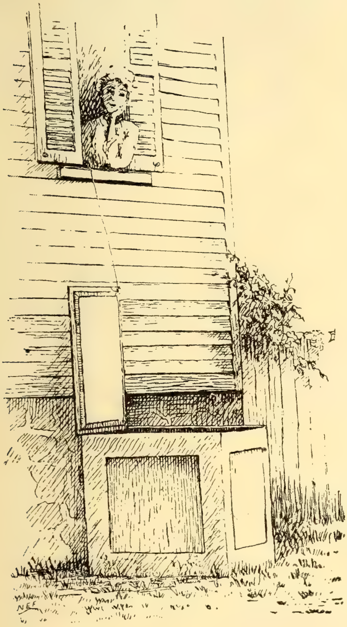


FIG. 72.

REFRIGERATOR HOT-BED.—(Fig. 72.) The cut explains the device.—*Sister Gracious, in American Garden, 684.*

DEVICE FOR ARRANGING AND PRESERVING CUT-FLOWERS.—(Fig. 73.) The material used for making the forms is peat or turf, and parts are

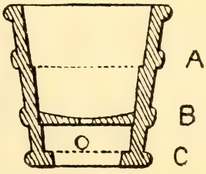


FIG. 75.

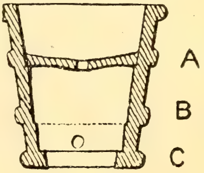


FIG. 76.

fastened together with small pieces of wood as shown in

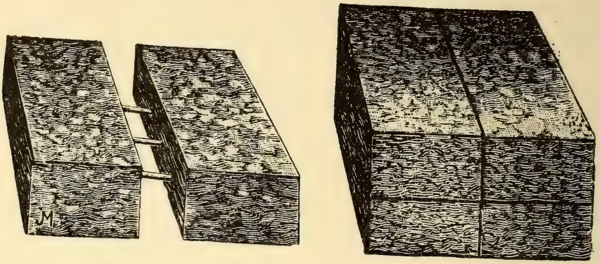


Fig. 73.

the figure. —*F. Schmidt, in Der Praktische Ratgeber im Obst-und Gartenbau, 8.*

Fry's Improved Flower-Pot.—(Figs. 74, 75, 76.) "Mr.

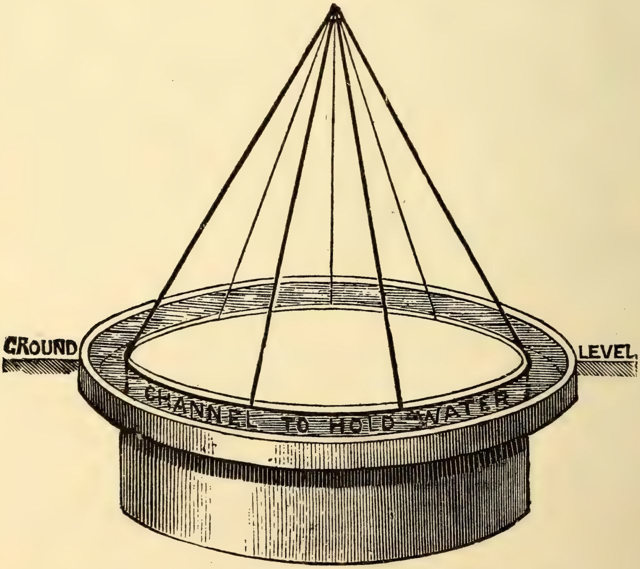

GROUND
LEVEL
CHANNEL TO HOLD WATER

Fig. 77.

Fry's object has been to provide each pot with three movable bottoms, so that the depths, especially in the case of large sizes, may be readily adapted to the requirements of the plants."—*Gardeners' Magazine, 58.*

SEED-PAN PROTECTOR.—(Fig. 77.) A seed-pan made with a water-trough over which snails, worms and other pests cannot crawl. This pan is plunged in the soil and it may be covered with a hand-light, as shown in the illustration.—*Wm. Moody Bell, in Journal of Horticulture, 481.*

§ 12. *Necrology of 1891.*

IN AMERICA.

Charles P. Anderson, a leading rose-grower, died at his home at Flushing, Long Island, September 16, at 46 years of age. Mr. Anderson was well known through his connection with the late John Henderson. He was born in Sheffield, England, coming to this country when 21 years of age. He was trained in the florists' business at the establishment of B. S. Williams, and afterwards at Kew. His first service in this country was with Isaac Buchanan. He later became connected with the rose establishment of T. J. Slaughter, Madison, N. J. In 1883 he took an important position with Mr. Henderson.

⁂

Edward Crosby Badeau, the last of the early fruit-importers of this city [New York], died at his home on Taylor street, West Brighton, Staten Island, Saturday evening, August 15, of heart failure. He had been ill for ten days with pneumonia, but was thought yesterday to be much improved. Mr. Badeau was born in this city March 8, 1816. Fifty years ago he entered the business of fruit importation at No. 209 Washington street, as the head of the firm of Badeau & Lockwood. The firm afterward was Badeau, Lockwood & Co., and in 1872 they failed owing to the heavy defalcation of Frederick Bailey, their bookkeeper. But Mr. Badeau continued his business until prostrated by his last illness.—*Fruit Trade Journal.*

⁂

Albert Benz, Dougston, New York [Long Island], died November 10, of pneumonia. He was well-known as a pansy specialist, and also as a grower of lily-of-the-valley. He was 38 years old. Mr. Benz came to America from Würtemberg 18 years ago. He was once a student of the Pomological Institute at Reutlingen. He was well and favorably known to the trade, and was a successful business man.

⁂

Alexander Fraser, an expert florist and grape-grower of Baltimore, died July 15.

⁂

James Hutchinson, a prominent California florist, died in February at his home in Oakland. He was identified with several prominent horticultural movements, having been one of the original stockholders of the California Nursery Company. Mr. Hutchinson was born in Glasgow, Scotland, in 1824. At the age of 22 he was head gardener for the Earl of Limerick, and soon after had charge of the famous Princess Gardens, in Edinburgh. He came to America in 1848, and went to California in 1852.

⁂

George Phelps Lawrence, senior partner of the fruit-importing firm of Lawrence, Giles & Co., of New York, died at his residence at Saugatuck, Conn., in December.

⁂

Allen Lloyd, a prominent florist of Lafayette, Indiana, died March 10. He was born in New York State in 1808. He was probably the first outside florist to ship plants to Indianapolis and Chicago.

⁂

Elisha Moody, a well-known nurseryman of Lockport, N. Y., died during the year.

⁂

James H. Munson died in Chicago January 15. He was at one time prominently connected with the seed business with Hiram Sibley & Co., and later with Joseph Breck & Sons.

⁂

Henry Nanz, Sr., the pioneer florist of Louisville, Kentucky, died May 1. He was born in Stuttgart, Germany, in 1819, and came to this country in 1847.

⁂

G. S. Palmer, a well-known fruit-dealer of New York city, died of pneumonia December 15, 1891, in his 42d year.

He was born on a farm in Ulster county, New York. He was widely known as one of the most straightforward and conscientious of metropolitan merchants. An article from his pen appears upon page 24 of this volume.

⁂

Charles M. Presby, who, with Charles P. Anderson, purchased the business of the late John Henderson, died in Chemnitz, Saxony, May 17, while on a business trip. He was born in Montreal in 1837, and followed the dry-goods trade as a business.

⁂

John Russell, of Indianapolis, Indiana, died early in the year at the age of 90. In 1824 he purchased the *New England Farmer.* He became enthusiastic for the foundation of a horticultural society, and the influence of his paper was directed to the now well-known Massachusetts Horticultural Society. In 1868 he was appointed librarian in the Department of Agriculture.

⁂

Frederick Schlegel, a florist of Rochester, N. Y., and at one time in charge of the greenhouse department at Ellwanger & Barry's, died May 15. He was born in Baden in 1832.

⁂

Charles P. Starr, founder and proprietor of the Pleasantville greenhouses, Avondale, Pa., died on the 23d of December, 1891, aged 45 years. He early in life commenced the cultivation of flowers, the growing of carnations and tuberoses being a specialty with him. He originated several new varieties, of which one was the Pearl tuberose, and the Buttercup carnation. From a small beginning, by strict integrity and courteous treatment toward his customers, his business steadily increased, until of late years he had to refuse demands for articles of his production. His cardinal principle was honesty. He leaves a widow and five children—two daughters and three sons. He was born on the same property where he died, although he rebuilt the dwelling-house some six years ago. Samuel Wickersham.

BENJAMIN COLES TOWNSEND, Bay Ridge, New York [Long Island], died January 13, 1891, at 73 years of age. He was a retired business man, but was passionately devoted to floriculture, and was once president of the New York Horticultural Society.

* * *

DOMINICUS WEGMAN, president of the Foreign Fruit Exchange of the City of New York since 1888, died August 28. Mr. Wegman was born in Bavaria in 1834, and came to this country at the age of 16. He won an enviable reputation in the fruit business of New York, and was known as the "Father of the Fruit Trade," because of the fatherly interest which he took in the younger merchants.

* * *

LEO WELTZ, a well-known horticulturist and nurseryman of Ohio, died during the year. He was prominent in horticultural enterprises, and was once sent by the government to Russia to report upon the resources of that and adjacent countries.

ABROAD.

A. ALPHAND, the author of "The Parks, Gardens and Promenades of Paris," died December 5, at the age of 74 years.

* * *

JOHN ANDERSON ANDERSON, one of the leading promoters of the Scottish Arboricultural Society, and a recognized authority on the coniferæ, died December 6, aged 80 years.

* * *

LÉON AURANGE, a prominent horticulturist of Cannes, France, died in March. He wrote considerably for the *Revue Horticole* and other French papers.

* * *

AMBROSE BALFE died December 8, aged 77 years. Mr. Balfe was for many years the secretary of the Royal Horticultural Society of Ireland, and he held this office until a short time before his death. He also edited and contributed to the horticultural columns of the *Irish Farmers' Gazette* for many years.

H. G. Bard, a well-known English propagator of plants and commercial horticulturist, died early in the year, aged 68 years. It will be remembered that Mr. Bard took an active part in the experiments which the Messrs. Carter carried on with crossing varieties of wheat.

⁂

William Barron, a celebrated English horticulturist, died April 8, aged 86 years. Mr. Barron was for many years gardener at Elvaston Castle but he left this position and entered business as a nurseryman and landscape-gardener at Borrowash, near Derby. Here he accumulated a large collection of hardy trees and shrubs, his knowledge of which was remarkable. He also published a work entitled "The British Winter-Garden," which was well received.

⁂

G. Bashford, a famous English grape-grower, died in October.

⁂

Pierre Bertin, died at Versailles, France, April 3, aged 92 years. For many years he had been the director of an establishment which was everywhere known as a model of neatness and good cultivation. He resigned this position and retired from active life, although his gardens at Versailles still exhibited his horticultural skill. Mr. Bertin was a chevalier of the Mérite Agricole, and contributed largely to the horticultural journals of his country.

⁂

Andrew Botherston, a well-known English botanist, died early in the year at Kelso, in his 56th year.

⁂

Nicholas John Bott, one of the most noted of the chrysanthemum-growers on the Channel Islands, died in June, aged 71 years.

⁂

Samuel Bradley, of Brighton, England, the originator of several varieties of strawberries and of Bradley's Seedling Apple, died August 13, in his 72d year.

Francis Casey died suddenly of heart-disease, February 19, aged 55 years. He was principal foreman in the nurseries of the Messrs. Hugh Low & Co., Upper Clapton, England. He traveled considerably for the firm, and there was no man more popular in his line of work.

⁂

George Child, for many years a partner in the firm of Beck, Henderson & Child, seedsmen, died at Balham, England, March 28, in his 74th year.

⁂

Emil Clausen, head gardener at Nikita, in Crimea, died suddenly August 30 after twenty years of faithful service in this position. He was also a teacher in the agricultural institute at that place.

⁂

Thomas Cochrane, for twenty-two years superintendent of Finsbury Park, England, died May 6, in his 61st year.

⁂

Samuel Cooper, a well-known seedsman of Hadleigh, Suffolk, England, died April 3, aged 69.

⁂

Adolphe Courtois, general secretary of the syndicate of gardeners of the canton Sceaux, France, died February 5, aged 44 years.

⁂

Robert Cowan, formerly partner in the firm of Kennedy & Co., nurserymen and seedsmen, Dumfries, Scotland, died November 23.

⁂

George Cunningham, of Liverpool, England, died February 24, aged 91 years. In the north of England he was regarded as an authority on horticultural matters.

⁂

W. Alfred Dickson, a prominent English nurseryman, died December 24, aged 54 years.

⁂

Friedrich Carl Dietrich, curator of the botanical museum of Berlin, died September 13, at the age of 85 years.

John Dominy, died February 12, aged 72 years. The loss of this celebrated gardener will be severely felt in horticultural circles in England. In 1846 Mr. Dominy became connected with the nurseries of the Messrs. Veitch and he remained with the firm until 1881, when his health became poor. In 1856 his first hybrid orchid, *Calanthe Domini*, appeared, and this was followed by many others. Volum XXI. of *The Garden* was dedicated to Mr. Dominy, and it will be long before he is forgotten by orchid-growers. He was a member of the floral and also of the orchid committees of the Royal Horticultural Society, where his experience was valued highly.

⁂

James Murray Garden died at Aberdeen, Scotland, early in the year, aged 46 years. In his death the horticultural interests of northern Scotland suffer a severe blow, for it is mainly through the zeal and activity of Mr. Garden that the Royal Horticultural Society of Aberdeen attained its present flourishing condition, and the influence of this society is far-reaching.

⁂

Thomas Gilbert, nurseryman at Hastings, England, died February 15, aged 61 years,

⁂

Henry Glasscock, a well-known English dahlia-grower, died in October, at the age of 71.

⁂

John Grey, gardener to Lord Willoughby de Eresby, Stamford, England, died suddenly in March, aged 68 years.

⁂

Johannes Grönland, died at Dahme, Germany, February 13, aged 67 years. He first became known through the hybrids he obtained by crossing *Triticum vulgare* with species of ægilops. He assisted in preparing the German edition of Vilmorin's "Les Fleurs de Pleine Terre," and also wrote for horticultural journals. At the time of his death he occupied the position of botanist in the experiment station, and lecturer in the agricultural school at Dahme.

August Francois Hardy, director of the Horticultural School of France, at Versailles, and one of the most prominent horticulturists of that country, died November 24. He held the important post of first vice-president of the National Horticultural Society.

⁂

Cardinal Lud. Haynald, a celebrated botanist, died at the age of 75 years. His best-known work is "The Plants of the Bible."

⁂

F. Hérincq died at the age of 71 years. He had been editor of the *L'Horticulteur Francais*, and collaborator on the "Manuel des Plantes," by Jacques.

⁂

Dr. Hermann Hoffmann, director of the botanic gardens at Giessen, died October 26, aged 73 years. He was well-known as the most successful of all students of phenology.

⁂

Mr. Ingelrest, landscape-gardener of Ghent, died early in the year.

⁂

Dr. L. Just, professor of botany at the Carlsruhe Polytechnicum, died August 30. He was also director of the Botanic Garden at Carlsruhe, and the founder of the well-known botanical publication, *Botanischer Jahresbericht.*

⁂

Edward Kemp, of Birkenhead, England, died March 2, aged 74 years. He was an able landscape-gardener, and his book, "How to Lay Out a Garden," ran through three editions. This work is still the best concise general book on landscape-gardening, even for America.

⁂

Albert Kletschke, a well-known and highly-respected German horticulturist, died April 4, aged 66 years.

⁂

Franz Kramer, who for thirty years had charge of one of the most prominent collections of orchids in Europe—that of Legationsrath Rucker-Jenisch of Flottbeck-Hamburg—died November 22.

Mr. Lecaron, one of the leading seedsmen and florists of Paris, died at the age of 50 years.

* * *

Antoine Levet, the well-known rose-grower, died at Lyons, France, August 21, aged 74 years. Many of Levet's roses are well-known in America, especially Perle des Jardins, Paul Neyron, Reine Marie Henriette and F. Michelon.

* * *

William McCorquodale, a well-known English forester and one particularly well-acquainted with the coniferæ, died April 17, aged 81 years. He was forester to the Earl of Mansfield.

* * *

Alexander W. McNaughton, of the Vineyard Nursery, Banbury, England, died early in the year, aged 49 years. He was particularly skillful in raising early and late grapes, and was largely instrumental in developing the now flourishing Chrysanthemum and Fruit Society.

* * *

Frank Miles, who was so well known through his pictorial sketches, died July 15, at the age of 40 years. He was an enthusiastic lover of horticulture as well as of art, and he did much to revive the taste for the cultivation of hardy perennials, and especially of bulbous plants.

* * *

Phillip Mathews, president of the York Horticultural Society, died last August.

* * *

Dr. C. J. Maximowicz, of St. Petersburg, Russia, died February 16. This well-known botanist was everywhere recognized as one of the leading scientists of his age, and his loss will be severely felt. He paid particular attention to the flora of Eastern Asia, especially to that of Japan ; and at the time of his death he was engaged in describing the floras of Thibet, central Asia and Mongolia. His collections from these countries are exceedingly rich ; they are deposited at Prjevalsky and Potanin.

* * *

J. F. Meston, one of the most able English landscape-gardeners, died at Brighton.

CARL WILHELM VON NÄGELI, probably the greatest German botanist of the time, died May 11, aged 74 years. His principal works relate to anatomy, morphology and embryology. In systematic work he paid particular attention to algæ, and to the genus hieracium and its hybrids.

* * *

Mr. PAVARD, director of the national nurseries at Trianon, France, died early in the year. He also held the position of professor of ornamental arboriculture in the national school of horticulture at Versailles.

* * *

JOHN PAVEY, of the Cotham nurseries, Bristol, England, died at the age of 66 years.

* * *

CHARLES PENNELL, a well-known nurseryman of Lincoln, England, died June 21, aged 65 years.

* * *

P. E. DE PUYDT, of Belgium, died at the age of 81 years. He was appointed secretary to the Royal Horticultural Society of Mons in 1831, and this position he held up to the time of his death. His first work, "Le Traite de la Culture des Plantes de Serre Froid" was published in 1860. He was one of the first to grow orchids, and this family of plants always had a particular fascination for him. In 1880 his "Les Orchidées" appeared. Mr. de Puydt also contributed extensively to the leading horticultural papers, especially to the *Journal des Orchidees.*

* * *

ACHILLE RAMÉ, a well-known French horticulturist and economic entomologist, died April 15, aged 54 years.

* * *

REV. A. RAWSON, of Fallbarrow, Bowness, Windermere, England, died May 18, aged 72 years. Mr. Rawson was one of the most hospitable and thorough florists in England; and while he admired all flowers he turned his attention particularly to pelargoniums, carnations, violets, primroses and polyanthus, originating several new varieties.

William Richards, for twenty years publisher and business manager of *The Gardeners' Chronicle*, died March 14, aged 44 years. Mr. Richards leaves a widow and four children. We have to mourn a straightforward, high-principled colleague and an excellent man of business; whilst his horticultural friends, who are legion, will share our sense of the loss of a kind-hearted, right-minded friend whose help and judgment could always be depended upon in case of need, and who never seemed better pleased than when he was helping forward some charity or other public object connected with horticulture.—*The Gardeners' Chronicle.*

⁂

Emil Rönnenkamp, garden-inspector of the city of Berlin, Germany, died March 10, at 53 years of age.

⁂

Ant. Roozen, founder of the firm of Ant. Roozen & Son, of Haarlem, died at Overveen, Dec. 16, at the age of 86 years.

⁂

Theodor Rümpler, died May 23, aged 72 years. At the time of his death he was a publisher of garden literature but had previously held several positions of honor and trust. The most popular of his many books is his "Illustriertes Gartenbau-Lexicon," which is a standard work on horticultural subjects.

⁂

Dr. Schomburgk, curator of the Adelaide Botanic Gardens, Australia, died April 4, at Adelaide. Dr. Schomburgk was an ideal scientist, simple and unassuming, but always keeping in view the work to which he devoted his long and useful life. He was driven from Germany on account of his political opinions, and settled in Adelaide. He was appointed curator of the Botanic Gardens, and held this position until the time of his death. For nearly twenty-five years he devoted himself to enlarging and improving the gardens, and his labors have been rewarded, for the gardens now occupy a high place in the scientific world.

⁂

G. Schrefeld, inspector of schools of forestry, died in Moscow, Russia, January 27.

JEAN SISLEY, the noted rose-grower, died at Lyons, France, January 12, aged 87 years.

⁂

THOMAS STATTER, one of the most enthusiastic orchid-growers of England, died in the latter part of December.

⁂

GEORGE STEEL, nurseryman of Richmond, England, died at the age of 82 years.

⁂

JEAN BAPTISTE VERLOT, for many years landscape-gardener of the city of Grenoble, died January 28, aged 75 years. Known also as the author of an excellent treatise entitled "Sur la Production des Variétiés."

⁂

JEAN BAPTISTE JOSEPH VAN VOLXEM, died September 14, at the age of 61 years. He had traveled extensively, and had studied the floras of various parts of the world. He discovered and introduced *Tacsonia Volxemii* which has now come into general cultivation. The Caucasian maple, *Acer Van Volxemii* was also made known through his efforts. Mr. Van Volxem established an arboretum near Vilvorde, and here he brought together many specimens of hardy shrubs and trees, the American representatives being prominent.

⁂

JAMES WELLS, a veteran English gardener, died in March, at the age of 104 years.

⁂

AD. WETTER, head gardener of the imperial gardens at Schonbrunn, near Vienna, Austria, died at the age of 76 years. He had taken an active part in the affairs of the Imperial Society of Horticulture, of Vienna, and had materially aided all horticultural progress in Austria.

⁂

JAMES WILLIAMS, father of the late B. S. Williams (see ANNALS for 1890, 299), died at Upper Holloway, England, December 24, 1891, in his ninety-fifth year. In 1817 he entered the service of Mr. Warner, Hoddesden, where he remained until he retired a few years ago.

John Wilson, for thirty years secretary of the York Gala and Floral Fête, died May 1.

⁂

François Wiot, a noted Belgian horticulturist, died April 4, aged 69 years.

⁂

Dr. William Robert Woodman, an English gardener and nurseryman, died December 20, aged 62 years.

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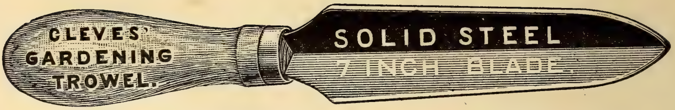
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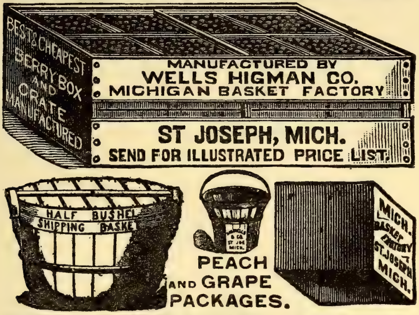
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